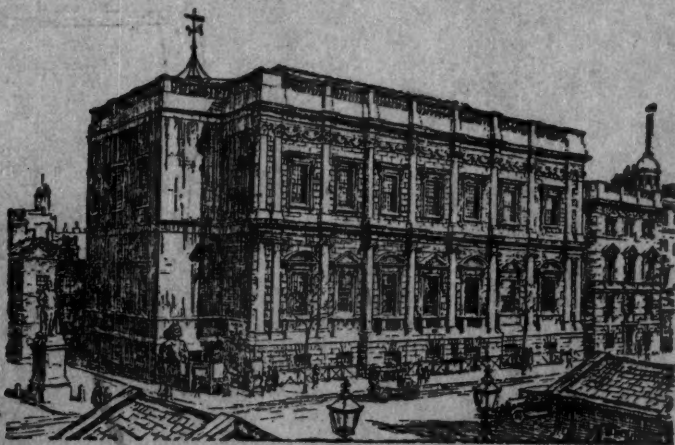


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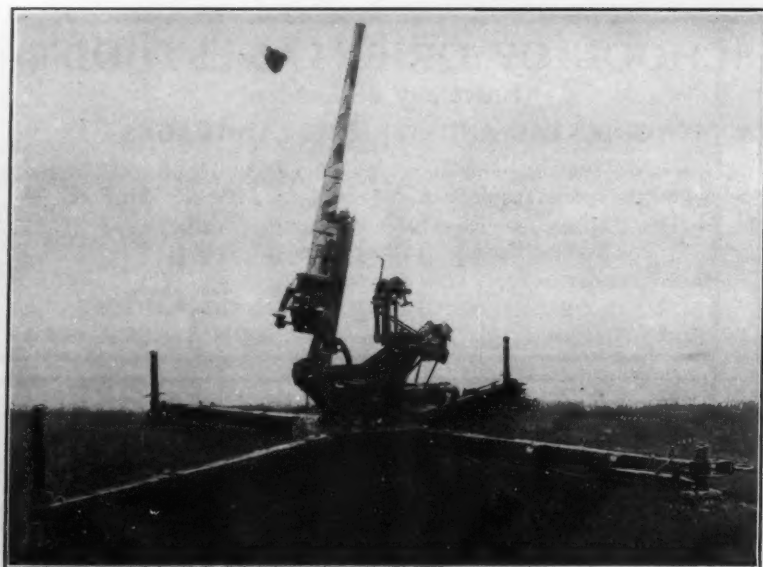
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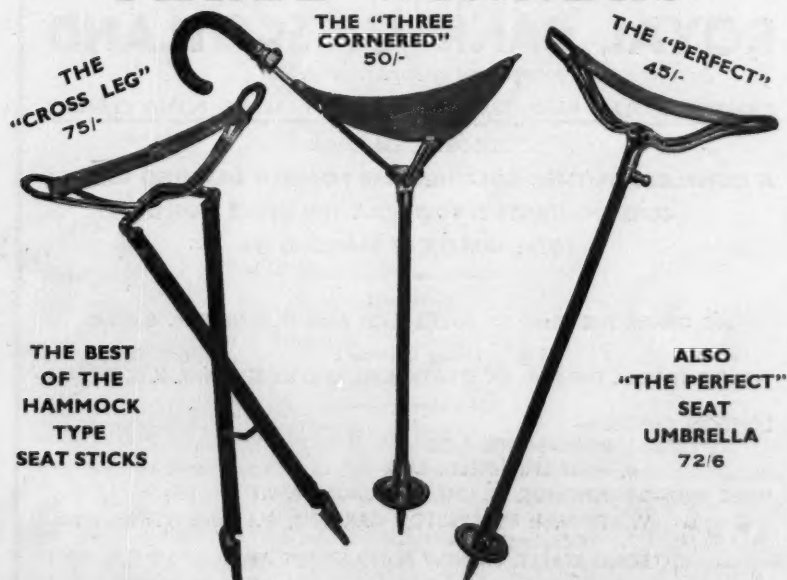
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Commissioned Officers of *all* H.M. fighting Services, including those of the Dominions, Colonies and India, and Midshipmen of the Royal Navy, Royal Naval Reserve and Royal Naval Volunteer Reserve, are eligible for membership without proposal or ballot.

Naval, Military and Air Force Cadets are eligible on the recommendation of their Commanding Officers.

An Officers' Mess may subscribe to the JOURNAL, but is *not* eligible for membership.

TERMS OF SUBSCRIPTION

ANNUAL MEMBERS.—Subscription £1 5s. od., payable on joining and on 1st January yearly. (NOTE.—The Entrance Fee has been temporarily suspended).

LIFE MEMBERS.—

- (a) £20 os. od., payable in one sum or;
- (b) £21 os. od., payable in four instalments of Five Guineas, the first on joining, the others on 1st January of each succeeding year.

The above rates of subscription entitle Members to the loan of four volumes at a time from the Library, provided they are at Home or at those stations abroad where arrangements exist for forwarding books.

It is important that Officers joining should furnish full and clear particulars of their Name, Rank, Ship, Regiment or R.A.F. Squadron, etc., and the address to which they wish their JOURNALS sent.

Officers of the Indian, Dominion and Colonial Naval, Military, and Air Forces temporarily in the United Kingdom may become members for a period of six months on payment of Ten Shillings and Sixpence, or One Guinea for twelve months. The additional subscription to the Lending Library is Five Shillings for six months.

THE INSTITUTION

The Royal United Service Institution is situated just below the War Office in Whitehall. It has the best professional Library in the United Kingdom; a Lecture Theatre, where an autumn and winter session of lectures is devoted to subjects of current or historical Service interest. The Reading and Smoking Rooms are provided with the leading papers, periodicals and writing materials.

The Institution is open daily from 10 a.m. to 7 p.m., except Sunday, Christmas Day and Good Friday.

THE JOURNAL

The R.U.S.I. JOURNAL is published quarterly and sent post free to Members in any part of the world. Copies may be purchased by non-members, price 7s. 6d.

THE MUSEUM

Situated in the Banqueting Hall of the old Palace of Whitehall (1622), with its magnificent Rubens ceiling, the R.U.S. Museum is a treasure house of relics and mementoes of great victories and renowned warriors. There is also a most valuable collection of Uniforms, Medals, Ship, Tank, and Aircraft Models, and models of the battles of Trafalgar and Waterloo.

For Members and their friends, there are private entrances to the Museum from the Institution.

H.M. Forces in uniform are admitted free at the public entrance.

Admission to the general public is 1s.; Wednesday and Saturday after Noon, 6d.

SECRETARY'S NOTES

November, 1937.

ROYAL VISIT

Their Majesties the Queen and Queen Mary visited the Royal United Service Institution on the afternoon of 4th November. They were received by General Sir Felix Ready, G.B.E., K.C.B., C.S.I., C.M.G., D.S.O., the Chairman of the Council, and Captain E. Altham, C.B., R.N., Secretary and Chief Executive Officer, and were conducted round the Museum.

They expressed great interest in the Institution's Collection and signed the visitors' book.

THE BANQUETING HOUSE

The following letter was addressed in the name of the Council to H.M. Office of Works:—

5th October, 1937.

SIR,—At their Meeting to-day, my Council considered certain reports which appeared in the Press recently, and which they had received from other sources, to the effect that it was under consideration to expel the Royal United Service Institution from the Banqueting House, Whitehall, with a view to that building being taken over for Government hospitality.

They were glad to see by a later report, published in the *Observer* of 3rd October, 1937, that such a project was denied at the Office of Works. Nevertheless they would be glad to be reassured that no such proposal will at any time receive official countenance by your Department.

The First Commissioner of H.M. Office of Works is doubtless aware that the use of the Banqueting House for the Institution's premises was the gift of Queen Victoria in 1890 as a mark of Her Majesty's appreciation of "the usefulness of the Institution in connection with the Naval and Military Forces," and the building was formally made over to the Council as from the 1st January, 1891, by a letter, dated 2nd December, 1890, signed by the Lord Chamberlain.

On the strength of this gracious Gift, and in fulfilment of their part of the scheme which had been laid before Her Majesty, the Council acquired an eighty years lease of the Crown Land immediately to the South of the Banqueting House. Here was erected a new communicating wing to provide a lecture theatre, library, etc. This building cost £23,000, and the subscription list was headed by Her Majesty the Queen, and Their Royal Highnesses the Prince of Wales, the Duke of Edinburgh, the Duke of Cambridge, and the Duke of Connaught. The other subscribers were Members and their friends. This section of the Institution is, of course, the property of the Members, at any rate until the expiration of the Crown Lease in thirty-five years' time.

The new quarters of the Institution—the Banqueting House and the new wing—were formally opened by H.R.H. the Prince of Wales on 20th February, 1895.

In these circumstances it appears to my Council inconceivable that there should ever be any suggestion of the Institution being deprived of this Royal Gift—the most valuable part of its premises. They trust that the First Commissioner will concur.

I am, sir,

Your obedient servant,

(Signed) E. ALTHAM, *Captain, R.N.,*
Secretary.

To the Secretary, H.M. Office of Works,
Storey's Gate, S.W.

The following reply was received :—

H.M. OFFICE OF WORKS,
STOREY'S GATE,
WESTMINSTER, S.W.1.
27th October, 1937.

SIR,—In reply to your letter of the 5th October, 1937, I am directed by the First Commissioner of His Majesty's Works, etc., to state that he is aware of the circumstances and conditions under which Queen Victoria granted the use of the Banqueting House, Whitehall, to the Royal United Service Institution in 1890, and that he is not unmindful of the distinguished character of the Museum which is housed therein. Sir Philip Sassoon feels that your Council will realize that he could not give any binding pledge that neither he nor his successors in office could, in any circumstances, ever be partners to or contemplate a change in the use of this building; but, for his part, he is sure that no proposal for a change would ever be made without the fullest consideration being given to the present and future requirements of the Institution.

I am, sir,

Your obedient servant,

(Signed) PATRICK DUFF.

The Secretary, Royal United Service Institution,
Whitehall, S.W.1.

Council

Lieut.-General Sir S. F. Muspratt, K.C.B., C.S.I., C.I.E., D.S.O., has been elected as the Indian Army Member of the Council vice Lieut.-General Sir R. C. Wilson, K.C.B., D.S.O.

Ex-Officio Members

Air Chief Marshal Sir C. L. N. Newall, K.C.B., C.M.G., C.B.E., A.M., has succeeded Marshal of the Royal Air Force Sir E. L. Ellington, G.C.B., C.M.G., C.B.E., as an *ex-officio* member of the Council on taking up the appointment of Chief of the Air Staff; and Major-General Sir Ronald F. Adam, Bart., D.S.O., O.B.E., has succeeded Lieut.-General the Viscount Gort, V.C., C.B., C.B.E., D.S.O., M.V.O., M.C., on taking up the appointment of Commandant of the Staff College, Camberley.

New Members

The following officers joined the Institution during the months of August, September and October, 1937 :—

ROYAL NAVY

Lieutenant R. D. H. S. Pankhurst, R.N.
Lieutenant E. A. Greenwood, R.N.
Paymaster-Lieutenant H. L. Cryer, R.N.

ARMY

Lieutenant J. L. Brind, The Somerset Light Infantry.
Captain K. W. Maurice-Jones, D.S.O., Royal Artillery.
Lieutenant C. H. Allen, The Welch Regiment.
Captain S. V. Keeling, The Cheshire Regiment.
Captain B. E. Abbott, 2/13th Frontier Force Rifles, I.A.
Lieutenant R. E. M. Thackeray, The Duke of Wellington's Regiment.
Captain F. D. Rome, The Royal Fusiliers.
Lieutenant R. R. L. Patey, Royal Artillery.
Captain M. H. ap Rhys Pryce, The Royal Welch Fusiliers.
Captain P. H. de Havilland, Royal Artillery.
Lieutenant-Colonel E. C. Brown, late 6th Gurkha Rifles, I.A.
Lieutenant C. J. L. Lewis, The Royal Welch Fusiliers.
Major I. W. G. Barry, 86th (E.A.) Herts. Yeomanry Field Brigade, Royal Artillery, T.A.
Lieutenant W. L. Nevill, Royal Artillery.
2nd Lieutenant G. S. Brodrick, Irish Guards.
2nd Lieutenant G. P. M. FitzGerald, Irish Guards.
Lieutenant D. W. Spooner, The Northamptonshire Regiment.
Major R. M. Jerram, M.C., Royal Tank Corps.
Lieutenant L. H. Bradshaw, The Somerset Light Infantry.
Captain A. F. Sinclair, Coldstream Guards.
Major G. G. H. Reade, late The Gloucestershire Regiment.
2nd Lieutenant M. P. Stormonth Darling, The Cameronians (Scottish Rifles).
Captain F. N. W. Gore, Royal Artillery.
Lieut.-Colonel W. H. Lang, late 6th D.C.O. Lancers, I.A.
Lieut.-Colonel P. J. Shears, The Border Regiment.
Captain H. W. H. Houghton, The Sherwood Foresters.
Lieutenant G. J. Pink, The King's African Rifles, Reserve of Officers.
Captain G. B. Cilverd, late R.F.A. (T.A.).
Captain W. R. Cox, The King's Shropshire Light Infantry.
Major R. L. M. Rosenberg, Royal Corps of Signals.
Captain W. R. J. Spittle, 8th Gurkha Rifles, I.A.
Lieutenant A. E. B. Trappes-Lomax, The Border Regiment.
Major G. A. Pilleau, M.C., The Queen's Royal Regiment.
Lieutenant David H. Walker, The Black Watch.
Lieutenant the Viscount Knebworth, The Queen's Bays.
2nd Lieutenant R. H. Farquhar, The Seaforth Highlanders.
Major H. C. S. Minchin, 2/12th Frontier Force Regiment (Sikhs), I.A.
Captain M. P. Ansell, 5th Royal Inniskilling Dragoon Guards.

Captain F. H. J. Maxse, 4th Bn. The Royal Sussex Regiment.
 Lieutenant E. C. Stanton, The King's Royal Rifle Corps.
 Lieutenant J. E. M. E. C. Leask, Royal Garhwal Rifles, I.A.
 Lieutenant L. S. Thomas, late Australian Corps of Signals.

ROYAL AIR FORCE

Flight-Lieutenant R. C. Field, R.A.F.
 Flight-Lieutenant W. C. Sheen, R.A.F.
 Squadron-Leader C. P. Brown, D.F.C., R.A.F.
 Flight-Lieutenant R. B. Councell, R.A.F.
 Flying Officer H. D. Fraser, R.A.F.
 Squadron Leader J. E. M. Bainbridge, R.A.F.

Suspension of Entrance Fee

As a temporary measure, and especially to enable as large a number of officers as possible to avail themselves of the facilities offered by the Institution during the period while His Majesty's Forces are being increased, the Entrance Fee has been suspended.

Officers of all ranks whose names appear on the current Official Lists can, therefore, join the Institution by paying the Annual Subscription of £1 5s. only. Membership will date from the 1st January.

Gold Medal Essay (Air), 1938

The following subject has been selected :—

" Discuss the influence which modern air forces may exert on British strategy in a major European War in which Great Britain is involved ; and suggest what higher control organization is desirable in order to co-ordinate the operations of the three Services."

Gold Medal Essay (Naval), 1937

The following essays have been received :—

" Fortuis in Arduis."
 " Bon Espoir."
 " He that commands at sea is at great liberty."
 " Computer."
 " Nil Desperandum."
 " To keep the foreigners from fooling us."
 " A safeguard unto our most gracious Sovereign Lord and his dominions."

CHRISTMAS CARDS

Christmas Cards specially designed for Members of the Institution are now on sale.

The outside is a coloured picture of types of Her Majesty's Services at the time of the Crimea, surrounding a medallion of the head of Queen Victoria—to whom the Institution is indebted for the gift of the use of the Banqueting House as part of its premises, and the Prince Consort—a former Royal Patron. Inside is the Institution's crest and seasonable greetings. The ribbon is a three-coloured one, combining Navy blue, Army red and Air Force light blue.

The price, including envelopes, is 6s. per dozen, post free.

In view of the popularity of last year's Christmas Card, with a reproduction of the original artist's black and white sketch of the exterior of the Banqueting House, these will also be on sale.

In addition there is a limited stock of Christmas Cards with a view of the interior of the Banqueting Hall.

Neither of these two types of cards is dated, and the price of each is 4s. per dozen with envelopes, post free.

Members are requested to make early application for the number of cards they require, stating which design, *and enclosing the requisite remittance with their order.*

LIBRARY

Members' Book List

A list of books required by Members can be registered, and they will be advised as soon as each book is available. Alternatively a registration card can be supplied on request to enable Members to compile their own lists.

Books are only sent without previous advice by the express wish of the Member.

Periodicals for Sale

The following periodicals for 1938 will be sold to the highest bidder:—"The Aeronautical Journal," "Airways," "Blackwood's Magazine," "Blue Peter," "Flight," "The Journal of the Royal Geographical Society," "Punch," "New Statesman and Nation," "The Spectator" and "The Scientific American."

Offers should be addressed to the Librarian before 15th January, 1938. Copies will be despatched as they are withdrawn from the Reading Room.

MUSEUM

Special Exhibition

An Exhibition, to represent "The Development of Imperial Air Communications," is being organized for the Christmas holidays and early part of 1938.

Additions

- (8947) Rifle jacket of the 4th Bombay Rifles, 1860. Tunic, sash, and shako of the 109th Bombay Infantry.—Presented by F. S. A. Maude, Esq.
- (8948) Sword of a General in the Nepalese Army, and sacrificial sword.—Presented by Field-Marshal Sir Philip Chetwode, Bt., G.C.B., O.M., G.C.S.I., K.C.M.G., D.S.O., D.C.L.
- (8949) Model of a 4.7 in. gun on Captain Percy Scott's mounting.—Presented by Mrs. C. Cullinan.
- (8950) Belt buckle of the Gordon Highlanders.—Presented by Lieut.-Colonel P. S. Allan, D.S.O.
- (8951) Water colour sketch of H.M.S. "Royal George."—Presented by Brigadier H. R. S. Massy.
- (8952) Two Guidons of the 3rd Bengal Irregular Cavalry, 1860.—Presented by Miss E. Mayne.
- (8953) Sabretache, cross belt and pouch of the 14th Hussars, 1890.—Presented by Miss Odium.
- (8954) A study in water colours of the Duke of Wellington in Spain.—Presented by Paymaster-Commander T. N. Jenkinson, R.N.R.
- (8955) Miniature of the Order of St. John of Jerusalem (Papal States).

- (8956) Model of an anchor made from materials recovered from the wreck of H.M.S. "Magicienne."—Presented by Lieutenant-Commander J. G. Gundry, R.N.
- (8957) An Austrian Schwarzlose machine gun.—Presented by Wing Commodore J. Cottle, M.B.E., D.F.C.
- (8958) Collection of Glengarry cap badges in two frames and a water colour sketch of the 13th Light Dragoons, 1845.
- (8959) Aquatint of a Grenadier, 1st Foot Guards, 1807.
- (8960) Sword, decorations and medals of Brigadier-General Duncan McDougal.—Presented by Mrs. Napier Miles.
- (8961) Field officer's sword, George IV period.—Presented by Rear-Admiral J. F. Warton, C.M.G., R.N.
- (8962) Grape shot which wounded Captain W. Bellairs during the Crimean War.—Presented by Rear-Admiral R. M. Bellairs, C.B., C.M.G., and Commander C. W. Bellairs, R.N.
- (8963) Bolt and piece of the keel of H.M. "Transport Briton," wrecked on the Andaman Islands on 11th November, 1844.—Presented by Captain R. Addison, R.I.A.S.C.

Loans

- (3643) Military Order of the Dragon, China, 1900.—Lent by Miss F. Russell.
- (3644) Sword of a Fencible Regiment, 1800.—Lent by Lieut.-Colonel Sir G. Dalrymple White, Bt.
- (3645) Relief Portraits in wax of Lord Nelson, Lord St. Vincent, Earl Howe and Admiral Duncan.—Lent by J. K. MacFarlan, Esq., R.A.
- (3646) Browning automatic pistol used by Earl Jellicoe during the Boxer rising in 1900.—Lent by Countess Jellicoe.

Attendance

The amount taken for admission during the past quarter was :—

£223 7s. 6d. in August.
£163 5s. od. in September.
£156 10s. od. in October.

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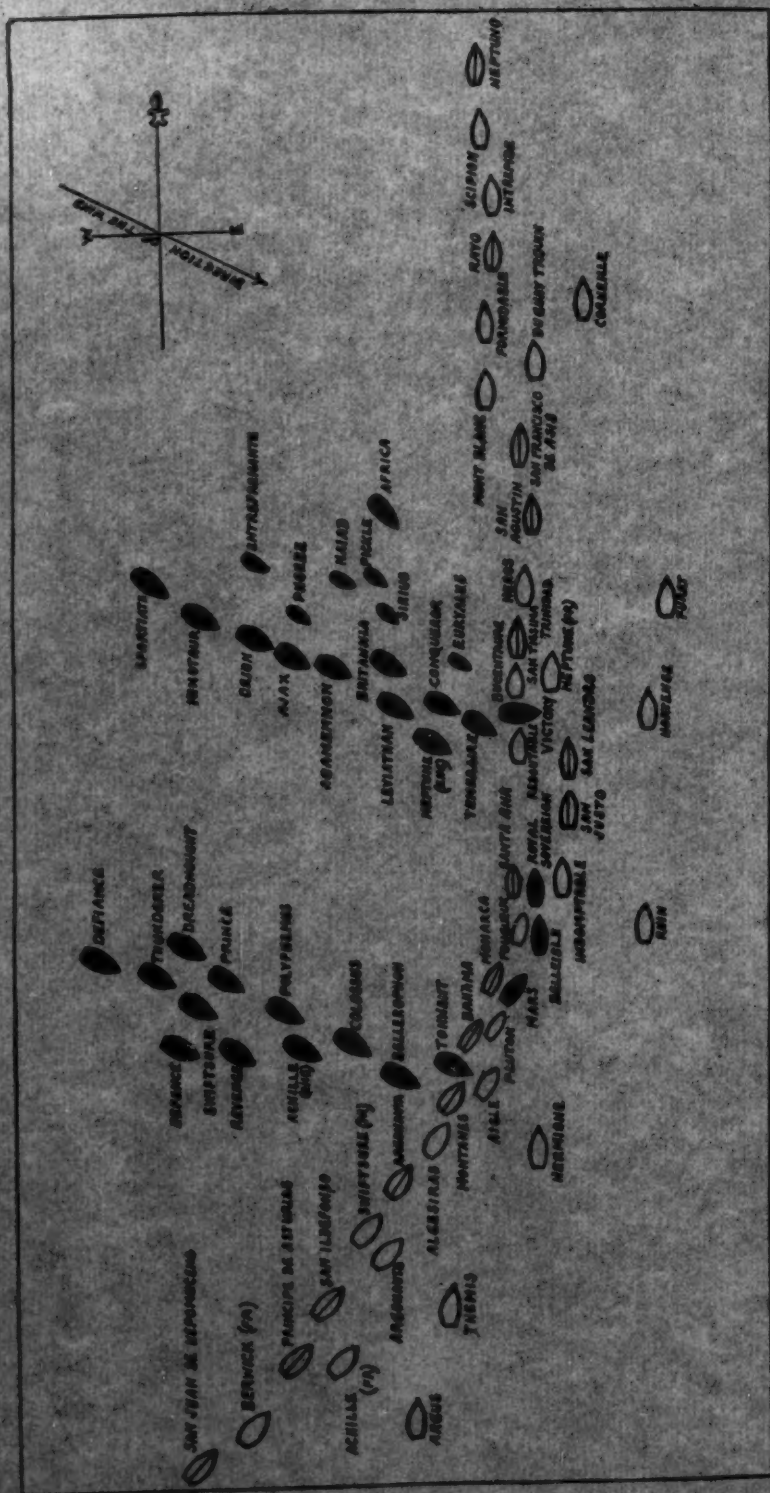
"Royal Sovereign"

"Victory"

THE ROYAL UNITED SERVICE INSTITUTION'S MODEL OF TRAFALGAR

AS REFITTED AND CORRECTED IN 1937





This Diagram shows the arrangement of the R.U.S.I. Model before it was corrected

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[Authors alone are responsible for the contents of their respective Papers. All communications, except those for perusal by the Editor only, should be addressed to the Secretary, Royal United Service Institution.]

SOME NEW ASPECTS OF THE BATTLE OF TRAFALGAR

By REAR-ADMIRAL A. H. TAYLOR, O.B.E.

On Wednesday, 20th October, 1937.

ADMIRAL SIR WILLIAM GOODENOUGH, G.C.B., M.V.O., in the Chair.

THE CHAIRMAN, in introducing the Lecturer, said: In all communities of Faith, in each year one day is set apart to enable the faithful to reaffirm their beliefs; we in this country, and especially in the Navy, set apart the 21st October on which we can reaffirm our belief that it is on the Navy that the Safety, Honour and Welfare of this country chiefly depend, and on which we celebrate the life and death of the greatest Admiral that ever lived.

It may interest you to hear how it was that we came to correct and repair the model which you will see in the Banqueting Hall of the Battle of Trafalgar. At a party which was given here—it happened that I was Chairman of the Council at the time—people, of whom Admiral Mark Kerr was one, pointed out that there were certain inaccuracies in the model; and a very observant friend of mine asked me whether it was a fact that in those days ships always sailed with their yards square, whatever their course was in relation to the wind. It was also quite evident that the models themselves required renewing. I got together a small Committee, of which Admiral Taylor, who is to speak to us this afternoon, and Colonel Harold Wyllie were members, and they, with the assistance of that fine artist and model-maker Mr. Hills, have done the work which you can see if you inspect the model.

Admiral Taylor has made a special study of Trafalgar, and I will ask him now to describe to us some new aspects.

LECTURE

THE Battle of Trafalgar is one of the most inspiring events in our history. But what gives it its permanent value and makes it so well worth studying, is that it is one of the most successful examples we have of the noble art of leading men in war. Contrary to what one might expect, the fleet which won this great victory in 1805 was not one which had worked together for months under Lord Nelson's command and been trained in his unusual methods of attack. Most of

its ships had come from the Channel Fleet in successive detachments. Only five of them had come from Lord Nelson's own command, the Mediterranean Fleet. Only eight of the Captains had served under him in that capacity; and only two, including Hardy—his own Flag-Captain, had been with him since he took up his command in 1803. Moreover, only five of the Captains had commanded their ships for as long as two years; and only five had previously commanded a ship of the line in battle.¹ It was a new fleet that Nelson had to train, and he had only twenty-two days in which to do it.

The Memorandum containing Nelson's plan of attack was issued twelve days before the battle. But the secret of its success is to be found, not in the Memorandum itself, but in the great confidence which Nelson inspired in all who met him. "When I came to explain to them the Nelson touch," he wrote, "it was like an electric shock. Some shed tears, all approved. It was new—it was singular—it was simple. It must succeed, if they will allow us to get at them."² Extracts from private letters give us some hint of Nelson's methods. Captain Duff of the "Mars," who had not known him before, wrote home: "He is so good and pleasant a man that we all wish to do what he likes without any kind of orders. I have been myself very lucky with most of my Admirals, but I really think the present the pleasantest I have met with; even this little detachment"—the advanced ships of the line—"is a kind thing to me . . . as it shows his attention and wish to bring me forward."³ And Collingwood wrote: "He did nothing without my counsel. We made our line of battle together and concerted the mode of attack which was put into action in the most admirable style."⁴ "It was the effect of system and nice combination, not of chance."⁵

But Nelson's methods did not commend themselves to everyone, Lord St. Vincent, his Commander-in-Chief, wrote to the Secretary of the Admiralty in 1800: "He cannot bear confinement to any object; he is a partisan; his ship always in the most dreadful disorder, and never can become an officer fit to be placed where I am."⁶ This opinion of Nelson's character somehow reached Paris, for on 5th June, 1805, Decres wrote to Napoleon—I take the quotation from the papers obtained from the Ministry of Marine by Admiral Sir Howard Kelly for the Trafalgar Committee in 1912: "There are no inferences to be drawn from the character of Lord Nelson. His boastfulness equals his inepti-

¹ See *The Trafalgar Roll*, Colonel R. H. Mackenzie.

² Nicolas, *Letters and Dispatches of Lord Nelson*, vii, 60.

³ Nicolas, *ibid.*, vii, 71.

⁴ Nicolas, *ibid.*, vii, 235.

⁵ Nicolas, *ibid.*, vii, 241.

⁶ *Navy Records Society*, xl, 329.

tude (and here I use the right word), but he has one eminent quality, that is that with his Captains the only pretensions he has are those of bravery and good fortune. From this it results that he is accessible to counsel, and that on difficult occasions, if it is he who nominally commands, it is another who really directs." But the proof of the pudding was in the eating !

The main features of the Plan of Attack were as follows :—

‘ The order of sailing was to be the order of battle.

The Second-in-Command, after the Admiral's intentions were known, was to have the entire direction of his own line. Every effort was to be made to capture the enemy's Commander-in-Chief.

The sixteen ships of the Lee line were to get as quickly as possible to the enemy's line and to cut through, beginning from the twelfth ship from the rear.

Should the enemy wear together or bear up and sail large, these twelve ships were still to be the sole object of attack of the lee line.

The remainder of the enemy's fleet was to be left to the management of the Commander-in-Chief, who would endeavour to take care that the movements of the Second-in-Command were as little interrupted as possible.

In case signals could neither be seen nor perfectly understood, no Captain could do very wrong if he placed his ship alongside that of an enemy.’

This Plan was far from simple in design, but simplicity itself in execution. Nelson would manœuvre the fleet into position by whatever means were suitable, and give direction to the attack ; the Second-in-Command would control his own division ; each Captain would select his own opponent, close him as quickly as possible and engage him till he struck. At Camperdown eight years before, Lord Duncan had found himself without the time to manœuvre his fleet into action, and bore down to the attack, relying for its final stages upon the individual judgment of his Captains. What Duncan was obliged to do by force of circumstances, Nelson did of set purpose. Although the movements actually used to take the fleet into action differed from those which Nelson had said he would probably employ, there can be no doubt that everyone from Collingwood downwards knew exactly what he had to do.

Villeneuve's Fighting Instructions show that he possessed a degree of penetration almost amounting to genius into the inward development of Nelson's tactical ideas, or else that he had somehow become aware of the contents of Nelson's Memorandum. He had written :—

"The enemy will not trouble to form line parallel to ours and fight it out with the gun . . . he will try to double our rear, cut through the line, and bring against ships thus isolated, groups of his own to surround and capture them. Captains must rely upon their courage and love of glory, rather than upon the signals of the Admiral, who may be already engaged and wrapped in smoke. . . . The Captain who is not in action is not at his post . . ." ¹ Coming events have seldom cast a clearer shadow.

Before I come to the battle I should explain how the narrative was worked out. The Admiralty Committee which sat in 1912 gave us the positions of the ships at Noon, and these were taken as a starting point. The later stages of the battle were worked out by building up a kind of framework from well-recorded events such as the fall of the "Victory's" mizen-topmast, compiling a narrative for each individual ship, and then fitting them together within the framework like the pieces of a jig-saw puzzle. The authorities used were the logs, James' history, the French and Spanish accounts in *The Campaign of Trafalgar* by Desbrière, Fraser's book *The Enemy at Trafalgar*, and various personal accounts, plans and pictures. On the whole the pieces fitted together well, considering that many of the times recorded were taken by the bells. James—on most points of fact a model of industry and accuracy—had apparently been misled by a plan which inverted the sequence of the ships in the rear of the Combined Fleet, a mistake in which he was followed by most of the historians and biographers before Desbrière. This had made the general course of the battle almost impossible to follow. I think, however, that we can now trace, with a fair degree of accuracy, the actual working out of Nelson's plan of battle. A full account is to be published by the Society for Nautical Research in aid of the Victory Museum. The Trafalgar Committee's plan put the ships rather too far apart. Had they continued their investigation beyond Noon, they would, I think, have found that insufficient allowance had been made for the movements of the Combined Fleet. The Institution's model shows the ships too close together, for reasons of space; but it errs in good company, since all marine painters have had to make a similar adjustment, not to be picturesque, but to correct an optical illusion and make the scene look right to the eye. ²

The reason why a naval battle is fought is always an important factor in its tactics; never more so than at Trafalgar. Villeneuve went out to fight because Napoleon had commanded him to enter the Mediterranean

¹ Desbrière, *The Campaign of Trafalgar*, trans. Eastwick, ii, 131.

² For a description of the alterations which have been made to this model during the current year, see p. 710.

at the first favourable opportunity, proceed to Naples, land his troops there and return to Toulon. When Napoleon gave these orders on 15th September, he still believed that his strategy had scattered the British Fleet and that the force outside Cadiz was a weak one. Three days later modified orders were given to Rosily, who was to be Villeneuve's successor. He was given discretion not to risk a battle unless circumstances were favourable. On 20th September intelligence reached Napoleon that the British force had been raised to twenty-seven ships of the line, but he left Paris three days later for the campaign which led to Ulm without modifying his orders to Villeneuve. Napoleon had been baffled by British strategy which he had failed to understand, and in a fit of petulance he threw away his fleet.

The Combined Fleet consisted of eighteen French and fifteen Spanish ships. Fourteen of them had been with Villeneuve in his cruise to the West Indies; thirteen had joined him at Ferrol in August; and the remaining six he found at Cadiz. All were weak in seamen, but carried troops. Half of them had had little or no exercise at sea, and three of the Cadiz ships had only just commissioned. The Spanish officers had good reason to doubt the wisdom of Napoleon's orders, but for the honour of their flag they agreed to carry them out.

On 18th October, Villeneuve learnt that two of Nelson's ships were at Gibraltar and that four more had sailed to the eastwards. He decided to go out as soon as the weather allowed. As Desbrière says: "Villeneuve would have utterly condemned himself in the eyes of the Emperor and in the sight of his subordinates if he had not taken advantage of Nelson's force being lessened by six sail of the line, to put to sea."¹ When the Combined Fleet sailed on 20th October it was with the deliberate intention of offering battle. Nelson did not actually have to solve the problem that confronted Jellicoe at Jutland—how to force action on a fleet whose object was to break away. But he had taken the necessary steps to do so. Just after dark on the 20th, with the wind W.S.W., he placed his fleet ten miles on the weather bow of the Combined Fleet, which was making good a course about South. At 4 o'clock in the morning he wore to the northward, and thus at daylight had reached a position just before Villeneuve's weather beam, ready to strike at him whether he held his southerly course or turned back towards Cadiz.

There is nothing to tell us whether Nelson considered making his attack at night. His fleet though slightly inferior in numbers was greatly superior in training and sea experience. He would have caught the Combined Fleet in disorder, for Villeneuve had had to form line of battle on the leewardmost ship without regard to sequence, and the ships

¹ Desbrière, *The Campaign of Trafalgar*, trans. Eastwick, i, 183.

of all four squadrons were mixed together. Nelson may have been deterred by the difficulty of telling friend from foe in the *mêlée* he intended to bring about. Perhaps, like Alexander, 'he would not steal a victory.' But what probably led him to wait was the wish to get the Combined Fleet as far as possible from Cadiz before the battle was launched. At any rate, the ships' companies of the British fleet got a good night's rest, while their adversaries spent the night at action stations.

The morning was clear, the wind W.N.W. and very light, and there was a swell coming in from the westward. The enemy was sighted nine miles E. by S. in an irregular line of battle standing to the southward. At 6.10 a.m. Nelson made the signals to form the order of sailing in two columns and to bear up and sail large on a course of E.N.E. This course took the British Fleet towards Villeneuve's line of retreat to Cadiz and made the "Royal Sovereign's" station 6 cables on the "Victory's" starboard beam, that is to say, S.S.E. of her. At 6.46 a.m. Nelson altered the course of the fleet two points to the southward, i.e. to East. This was the last manœuvring signal he made. Villeneuve was still steering to the southward. If he had continued to do so, the British Fleet would have had to wear round to a course of about South-East, and Nelson would have moved his division across the rear of Collingwood's, or left the van to Collingwood while he himself attacked the rear. Nelson wanted the enemy to keep to the southward, clear of the San Pedro shoal, and took the action which was most likely to induce him to do so or which would cut him off if he turned North.

The first thing Villeneuve had to do was to get his fleet out of its emergency line of battle into its proper organization. The signal for this was made at 6.20, and at 7 o'clock the "Redoubtable"—which ship being well commanded had been leading the line since midnight, wore out of the line to resume her proper station in the centre, thus making Nelson think that the Combined Fleet was wearing in succession. Villeneuve had no time to lose. He was drawing away from Cadiz and Nelson was steering to cut off his retreat. To bear away to the south-eastward would commit him to the passage of the Straits with Nelson in chase and the six ships near Gibraltar ahead of him. At 8 o'clock, although the Combined Fleet was still in an unformed state, he hoisted the signal to wear together and form line of battle on the port tack in inverse order. As the flags went up, Churruca, commanding the "San Juan Nepomuceno," now to be the rear ship of the line, turned to his second in command with the words: "The fleet is doomed. The French Admiral does not know his business. He has compromised us all."¹

¹ Fraser, *The Enemy at Trafalgar*, p. 277.

When the Combined Fleet began to wear, no signal was made by Nelson, nor was any necessary. The "Victory" steered to close the twelfth ship from the van—the "Santísima Trinidad," an old acquaintance of Nelson's. Collingwood, in the "Royal Sovereign," steered to close the "Santa Ana." His instructions were to cut through, beginning from the twelfth ship from the rear. This would have given his division a superiority of fifteen to twelve. But there lay the "Santa Ana," a first rate, painted black all over, and flying a Vice-Admiral's flag. His other three-deckers were slow ships and well in rear. She was the sixteenth ship from the rear, and there was a French 80-gun ship doubling her to leeward, so that the number of ships the lee division took on was seventeen instead of twelve. Thus ended the plan of concentration upon the enemy's rear. All Nelson said, however, was "See how that noble fellow Collingwood carries his ship into action."

At 8.45, as soon as Collingwood could see that the Combined Fleet was going to turn back and fight on a northerly course, he ordered his division to form the port line of bearing. This was strictly in accordance with the Plan of Attack. It would have put the lee division on a line of bearing parallel to the new line of battle on which the Combined Fleet was forming. But as Collingwood also ordered his division to "make more sail, leading ship first" and the "Royal Sovereign" set all her canvas, there could be no question of ships getting into station; the effect was to allow each ship to steer her own course for her opponent under all possible sail. To observers in the rear of the Combined Fleet, Collingwood's ships appeared to be fanning out, and as the faster ships drew out, to split into three groups, headed by the "Royal Sovereign," the "Bellerophon" and "the Revenge," the first, fifth and eighth ships of the line. Thanks to Collingwood's method of attack and to the alignment into which the rear ships of the Combined Fleet fell, the first eight ships got into action within half an hour of the "Royal Sovereign." The remaining seven ships were following the "Revenge" and dropping astern of her; later on, two of them hauled out to starboard and doubled the rear of the enemy.

Nelson had no more manœuvring signals to make, but he sent a message by his frigates that it was his intention to break through the enemy's line at about the thirteenth or fourteenth ship and then make sail on the port tack for the enemy's van. He was steering to close the twelfth ship, but it was still open to him to range up the enemy's line to windward, where the "Africa" was coming down; and neither Ville-neuve nor Dumanoir could be certain that he would not do so. Nelson's message ended by saying that if by the mode prescribed they found it impracticable to get into action quickly, they might adopt whatever

they thought best, provided it led them quickly and closely alongside the enemy. One ship, the "Orion," Captain Codrington, took advantage of the discretion given him to haul out to starboard and close the centre, where his arrival was to prove most opportune.

It was not until 10 o'clock that all the ships of the Combined Fleet were round on the port tack, and many of them were still hove to. Some had bore away to the north-eastward to run down into the wake of the leading ship. Villeneuve, however, wanted the rear to be able to support the centre, by doubling upon the ships attacking it, so at 11.30 a.m. he ordered the Squadron of Observation, now in rear, to keep the wind. This put it upon a rough line of bearing, each ship on the weather quarter of her next ahead. But proper sequence had been lost. The leading ships of the two divisions of the Squadron of Observation had overrun the rear ships of the units next ahead of them. Ships in rear had been carrying more way than those in the centre and were beginning to run up alongside one another, the less skilful dropping to leeward. Thus it was that Collingwood saw before him "a crescent convexing to leeward," with several ships doubling one another both in the van and in the rear. Though unintentionally produced, it was a good defensive formation for the occasion, as Collingwood's first ships were to find it. "About 10 o'clock," says Blackwood, "Lord Nelson's anxiety to close with the enemy became very apparent; he frequently remarked that they put a good face upon it; but always quickly added—I'll give them such a dressing as they've never had before." Churruca was watching the "Bucentaure" for a signal to the van to tack. Lowering his telescope, he muttered "Perdidos," and turned up his hands to prayers.¹

At 11.58 a.m. the "Fougueux," next astern to the "Santa Ana," opened fire with a full broadside on the "Royal Sovereign" at a range of about a thousand yards. At about the same moment Nelson hoisted his last signal, "Engage the enemy more closely." This signal remained flying. The Admiral's work was done.

By 12.15 a.m. Villeneuve was no longer in any doubt that the "Victory" instead of running up the line to windward, was going to cut it somewhere near his flagship, and that unless the van ships tacked at once, they would be too late to support the centre. Instead of ordering them to tack or wear, however, he hoisted a single flag signal which meant—"Order to ships which owing to their actual positions are not engaged to take another which will bring them into action as quickly as possible."² Superficially, the purport of this signal was the

¹ Fraser, p. 278.

² Signal Book, French Navy, An. ix, Signal No. 5.

same as Nelson's "Engage the enemy more closely," in that it overrode all previous orders and called for independent action at the discretion of the officer to whom it was addressed. But instead of using it in this way, Villeneuve had said that it was to be regarded as a disgraceful stigma. It seems to have been made as a general signal to the van and rear; it told no one what the Admiral wanted done, and its only effect was to deprive the "Bucentaure" for several minutes of the support of one of her own seconds, the "Neptune." Rear-Admiral Dumanoir le Pelley, the Flag Officer in the van, probably failed to realize until far too late the direction and character of Nelson's attack; he continued to wait for a lead from his Admiral who, perhaps, was equally in doubt, and stood on the northward engaging the little "Africa" at long range.

The "Victory" had opened fire with some of her starboard guns on the ships ahead of the "Bucentaure" at 12.24 p.m. At 12.40, within musket shot of the latter, the "Victory" put her helm to port and steered for the stern of the French flagship. The "Redoutable" had taken the place of the French "Neptune" and run up so close that her jibboom touched the taffrail of the "Bucentaure," and the "Neptune" returning to her station had run up to leeward of the interval. Captain Hardy informed Nelson that it would be impossible to break through the enemy's line without running aboard one of their ships, and begged to know which he would prefer. "Take your choice, Hardy," he replied, "it does not much signify which." Hardy chose the "Redoutable." At 12.45, the "Victory" passed astern of the "Bucentaure," so close that as she rolled her mainyard touched the vangs of the Frenchman's gaff. The 68-pounder carronade on the "Victory's" forecastle, loaded with a round shot and a keg of musketballs, was fired straight along the crowded upper deck of the "Bucentaure," followed by the whole of the port broadside, double or treble shotted. At the same time the "Victory" ran aboard the "Redoutable," carried her bodily round to leeward and opened a wide gap astern of the "Bucentaure."

This is the moment illustrated in our model in the Banqueting Hall.

Passing from North to South, we see the van of the Combined Fleet close to the wind under topsails and topgallantsails, not yet attempting to tack, though the "Bucentaure" is flying Signal No. 5. The "Africa" is coming down from the northward, having missed the signal to wear at 8 o'clock the previous night, and is being engaged by the "Mont Blanc" and the "Duguay-Trouin," now known to us as the "Implacable." The next three ships are engaging the "Neptune," all without much effect. The "Victory" is raking the "Bucentaure" and has run aboard the "Redoutable," forcing her round to leeward,

The French "Neptune" is raking the "Victory" from ahead. The "Téméraire" has hauled out to starboard to pass astern of the "Redoutable," whom she eventually ran aboard; and the English "Neptune," Captain Fremantle, the "Leviathan" and the "Conqueror," in very close order, are steering for the gap which the "Victory" is opening for them astern of the "Bucentaure." The "Britannia," "Ajax" and "Agamemnon" are following the "Conqueror" at greater intervals; the "Orion" has hauled out to starboard to close the centre, and the "Minotaur" and "Spartiate" are following far astern.

The "Royal Sovereign" broke the line at 12.8 p.m., ten minutes after the Combined Fleet had opened fire upon her, and discharged a broadside and a half into the stern of the "Santa Ana," and her other broadside into the bows of the "Fougueux." She then ran up alongside the lee side of the "Santa Ana" and lay there with muzzles touching. Collingwood's blue Admiral's flag is flying at the fore—the last time, I believe, that that flag was flown in action. When Villeneuve hoisted his Signal No. 5, the French "Neptune," the "San Justo" and the "San Leandro" wore round to engage the "Royal Sovereign," but after a few minutes' ineffective fire they wore round again to support the "Bucentaure." The "Royal Sovereign" was also engaged by the "Indomptable," directly to leeward of her.

The "Belleisle" followed the "Royal Sovereign" through the same gap in the line five minutes later. She steered for the "Indomptable," but in trying to round her stern, ran aboard the "Fougueux" in the smoke, which was a great deal thicker than can be shown in the model. The "Indomptable" is just wearing round to rake the "Belleisle." After doing this she disappeared in the smoke and we lose all trace of her. She was wrecked with all hands in Cosmao's sortie two days later. The "Fougueux" eventually drew clear of the "Belleisle" and drifted on badly crippled into the "Téméraire," who took her. The "Belleisle" fought a most notable action. Lying disabled just to leeward of the centre of the hottest fighting, she came into action with no less than seven of the enemy's ships, as many as three at a time; but she was still full of fight and, when her last opponent was driven away, she took possession of a crippled Spanish 74.

Just astern of the "Santa Ana" is the "Mars," engaging the "Pluton" from to windward. The "Pluton" was ably handled by Captain Cosmao and the "Mars" was unable to break through the line—the only ship of Collingwood's division that did not do so. A few minutes later she was obliged to luff up to avoid running aboard the "Santa Ana," and in that position was raked by the "Fougueux" and the "Pluton," who luffed up into the wind to do so. Captain Duff was

killed and his ship was disabled. The "Pluton" dropped to leeward and attacked the "Belleisle" from the port quarter, where her guns were masked by the wreck of the mizenmast. The "Tonnant" has just silenced her first opponent, the "Monarca," and is about to run aboard the "Algésiras," which ship she captured after a very stout fight.

Astern of the "Algésiras" the ships of the Combined Fleet were doubling one another and those to leeward were hidden by the smoke from the British ships approaching from to windward. The "Bellerophon" passed between the "Bahama" and the "Montanes," but as she hauled to the wind to run up to leeward of the former, the topgallant-sails of the "Aigle" appeared above the smoke to leeward and she fell aboard her. The French "Swiftsure" had to luff up to clear the "Aigle" and received a raking broadside from the "Bellerophon" ahead, and as she paid off, another from the "Colossus" astern. As the "Colossus" hauled to the wind to engage the "Swiftsure," she fell aboard the French "Argonaute," who had also come up in the smoke to leeward. Thus the "Colossus" had to engage the "Argonaute" to leeward and the "Swiftsure" and the "Bahama," bearing down upon her to windward. The "Bellerophon" had her topmasts brought down and remained to windward, disabled. After an hour's fighting, the "Aigle" drifted clear and was eventually taken by the "Defiance," after a stout resistance.

The "Argonaute" was silenced by the "Colossus" in fifteen minutes; she disengaged herself and dropped to leeward among the frigates. The "Colossus" fought the "Swiftsure" and "Bahama" for two hours, and in the end, with the help of the "Orion," took both of them. Her casualties were the highest in the British fleet.

The English "Achille" is engaging the "Montanes" from to leeward. After forty minutes the "Montanes" sheered off and ran to leeward, and the "Achille" engaged the Spanish "Argonauta," who is seen coming up from the rear to leeward of her. After an hour's fighting the French "Achille" drifted down upon her to windward, and soon after the "Berwick" came up astern. On this, the French "Achille" and the "Argonauta" tried to get away to the south-eastwards but fell in with other ships, while the English "Achille" continued in action with the "Berwick" and took her.

The "Revenge" is engaging the French "Achille" and has just brought down her mizenmast and maintopmast. Five minutes later she cut the line between her and the "San Ildefonso" and presently found herself in action with Gravina's flagship, the "Principe de Asturias." The "Defiance," "Dreadnought" and "Thunderer" are

steering to close the "Principe de Asturias" and her supporters; the "Polyphemus" and "Swiftsure" have hauled out to starboard to double the enemy's rear; and further in rear are the "Defence," Captain George Hope, and finally the "Prince," with a long stern chase before them.

When Collingwood's leading ships came down to the attack they closed their opponents from just abaft the beam. As the action proceeded, the ships already engaged bore away to give or forestall a raking broadside or to avoid running aboard one another, and brought the rear ships of Collingwood's line more nearly astern, so that the converging action became a chase. Hence the "Defiance" and the ships astern of her took a long time to get into close action. At about 1.25 p.m. the "Defiance" overtook Gravina's flagship, the "Principe de Asturias," and tried to cut the line astern of her. The "Principe" bore away, accompanied by her seconds, the French "Achille" and the French "Berwick," with the "Revenge" and "Defiance" in attendance, and the "Dreadnought" and her consorts in pursuit. The "San Ildefonso" and the "San Juan de Nepomuceno" held their wind and stood towards the fighting ahead of them, where the "Bellerophon" lay dismasted. They never got there. The "San Juan" was silenced in ten minutes by the "Dreadnought"; the "San Ildefonso" was brought to action by the "Thunderer." Later on, she was captured by the "Defence," after over an hour's fighting.

At 1.30 p.m., when the "Bucentaure" was almost at the end of her resistance, Villeneuve hoisted the signal to the van to wear in succession. It was his last act. Five minutes later Lord Nelson received his wound. At 1.45 the last of the "Bucentaure's" masts fell, and she struck. At 2.5 the main and mizzenmasts of the "Santisima Trinidad" fell and she ceased firing. (This is the moment shown in the "Victory" panorama at Portsmouth.) A few minutes earlier the "Téméraire" had taken possession of the "Redoutable" and the "Fougueux." The ships ahead of the "Santisima Trinidad" ran on to the northward; the French "Neptune," "San Justo" and "San Leandro" wore round towards the ships in rear. The action in the centre was over and the enemy's Commander-in-Chief and the ships which stood by him were captured. The "Redoutable" had 568 men killed, wounded or drowned out of a company of 643. She had fought two three-deckers for an hour, and taken a large share in crippling both of them. Such a resistance has seldom been equalled, and never excelled. Captain Lucas had performed a great service to his fleet, not only in hampering the pursuit of the van, but in enabling the French "Neptune" and her consorts to go to the help of the rear.

After running about half a mile to the southward, the French "Neptune" and her colleagues found and attacked the disabled "Belleisle," already being engaged by the "Pluton" and "Aigle." The Spaniards seem to have done but little, probably because they had dropped too far to leeward, but the "Neptune" shot away the "Belleisle's" last remaining spars. "The "Belleisle," however, raised a jack on a pike on the stump of the foremast and continued engaging with every gun that would bear.

By 2.30 p.m. the Combined Fleet had been broken into half a dozen groups. In the centre and rear of it fifteen ships had been cut off, and eight of them had already been forced to strike or silenced. Two ships, the "Pluton" and the "Neptune," were engaging the dismasted "Belleisle"; five had dropped to leeward amongst the frigates; and one, the "Principe de Asturias," flying the flag of Admiral Gravina, was fighting her way towards them, pursued by the "Dreadnought," "Prince" and three other ships from the rear of Collingwood's column. The ten ships in the van had at last got round on to the starboard tack, but they were cut off from their friends by the centre and rear of Nelson's column, and had split into three groups, each too weak to take the offensive. Four ships had tacked and kept the wind, following Rear-Admiral Dumanoir, who had ordered the van to tack together. The other six wore, perhaps in compliance with Villeneuve's last signal to the van to wear in succession; and three of them, the "San Agustin," the "Intrépide," and the "Neptuno," gallantly stood back singly towards the scene of battle.

The "Principe de Asturias" had by now lost all her supporters, but none of her pursuers had succeeded in reaching her lee bow or bringing down a mast and so preventing her escape. At about 3.30 the "Prince" at last overtook her and gave her two raking broadsides. The Vice-Admiral had already been mortally wounded; now his First Captain fell unconscious and for a time she ceased to resist. When he came to his senses the colours were no longer flying, but he had them rehoisted. At this critical moment the French "Neptune" and the "Pluton," who had been driven away from the "Belleisle" by the "Polyphemus" and "Swiftsure," came to the rescue, and at the same time a signal reached the "Dreadnought" and her consorts to come to the wind on the port tack. They hauled to the wind and left the "Principe de Asturias" to crawl away.

The reason for this signal was the approach of Dumanoir who, with four of his ships, was steering to pass about half a mile to windward of the hulk of the "Bucentaure." The "Conqueror," "Britannia," "Ajax" and "Agamemnon" had hauled to the wind and engaged

them as they passed to windward, but the range was too great for their fire to be effective. The "Minotaur" and "Spartiate," who were far in rear of the weather column, passed at pistol shot ahead of Dumanoir's flagship, hove to and engaged them at short range in succession; and the "Victory," "Neptune," "Mars," "Royal Sovereign," "Téméraire," "Tonnant" and "Bellerophon" took up the action as they came within gunshot. Their gunfire, and the sight of the "Dreadnought" and her consorts beating up from to leeward, were sufficient to deter Dumanoir from any attempt to recover the prizes, and at 4.30 he hauled to the wind and ceased firing. A fortnight later he fell into the hands of Sir Richard Strachan.

Three of the van, the "San Agustin," "Intrépide" and "Neptuno," instead of following Dumanoir, had gallantly steered for the "Bucentaure," and sacrificed themselves for the honour of their flags. They were brought to action by the "Leviathan," "Africa," "Orion" and "Minotaur," while the "Conqueror," "Britannia," "Ajax" and "Agamemnon" pursued the remaining three ships of the van to the north-eastwards, until recalled by a further signal to come to the wind on the port tack. At about 4.30 Gravina hoisted the signal to rally and retired towards Cadiz with eleven ships in company. The "Intrépide" and "Neptuno" continued their gallant resistance until 5 p.m., and at 5.30 the French "Achille," which had been set on fire by a broadside from the "Prince," blew up. "Partial firing continued till 4.50," says the "Victory's" log, "when a victory having been reported to the Right Honourable Lord Viscount Nelson K.B. and Commander-in-Chief, he died of his wound."

Let us see how Lord Nelson's plan of attack worked out. The Lee Division of fifteen ships was to attack and capture the twelve rear ships of the enemy's line. When the time came, the eight leading ships of the Division engaged seventeen of the enemy and brought thirteen of them to close action. Of these they took six and so mishandled four more that they fell easily to other ships. The seven rear ships of the Lee Division captured or destroyed three ships already crippled, brought three fresh ships to action and took two of them. Thus sixteen ships were attacked; four escaped, two by early withdrawal and two by hard fighting; and twelve were taken. The Lee Division had successfully carried out its allotted task, without having had the numerical superiority intended.

The Weather Division was to prevent the enemy's van and centre from interfering with the movements of the Lee Division. This Nelson achieved by threatening the van until it was too late for its ten ships to intervene effectively, and by capturing the enemy's Commander-in-

Chief and his seconds. The five leading ships fought eight of the enemy and took three of them, excluding the "Fougueux." Three ships got away from the centre to support the rear, but only one of them took an effective part in the fighting, and she achieved but little.

Taking the main action as a whole, twenty ships fought twenty-five and took fifteen of them.

In the second action between the Weather Division and the van of the Combined Fleet, the three ships which gallantly sacrificed themselves were taken, and the other seven escaped. The lightness of the wind, which at first favoured Lord Nelson's plan of containing the van, hampered the pursuit, and together with the stout resistance of the "Redoutable," prevented the capture of the twenty ships for which Nelson said he had bargained.

The French and Spanish ships showed themselves no unworthy foes. Though most of their officers and men had had little experience in handling their ships and weapons and had been on deck much of the previous night, several of the ships, such as the "Redoutable," "Fougueux," "Pluton" and "Aigle," were admirably fought and handled. Most of them were gallantly defended to the last. No less than twenty-six out of the thirty-nine Flag Officers and Captains were killed or wounded. A comparison of the casualties sustained by the ships which fought one another is illuminating. (See Appendix.) The "Royal Sovereign," for example, though engaged by at least four ships for ten minutes before she ran up alongside the "Santa Ana," and by four more ships for twenty minutes afterwards, sustained little more than half the casualties which she inflicted on her opponent. The "Colossus" was engaged for ten minutes with the "Argonaute," and for about two hours with the "Bahama," and the French "Swiftsure." She had more men killed and wounded than any other ship in the British fleet, but with the help, for a few minutes each, of the "Bellerophon" and the "Orion," she inflicted over two and a half times that number of casualties on her three opponents.

These figures explain how it was that the leading ships of the British Fleet were able not only to sustain but to overwhelm the greater weight of fire opposed to them. They fired more often and with cooler aim; and the ships were better handled.

The attempt to bring a superior force against the enemy's rear was abandoned by Collingwood, apparently without much concern. If he had not done so, it seems likely that the "Santa Ana," like the "Principe," would have been able to get away. In view of Nelson's

opinion that one Englishman was equal to three Frenchmen¹—an opinion which in the vital matter of rate of fire seems to have been not far from the truth²—and that you had only to lay a Frenchman close to beat him,³ he was, I believe, much more anxious to get his ships quickly and closely alongside the enemy than he was to bring a concentration of fire upon him. His watchword was "Touch and Take."⁴

Perhaps Nelson's intention was not so much to double upon some of the ships attacked as to ensure that, if two or three ships were prevented by loss of masts from getting to close quarters, none of the twelve ships attacked would be left unengaged. What he did was not to give the British fleet a superiority of gunfire, but rather to make the fullest possible use of the individual superiority which he judged its ships to possess. He had rightly assessed the fighting value of his own ships and their ability to stand heavy punishment without loss of spirit, and he knew the qualities, both good and bad, of his opponents. At Trafalgar, as at the Nile and Copenhagen, his judgment enabled him, in engineering language, to work to a very low factor of safety. By his skill in placing his fleet at daylight that morning he had made it almost impossible for Villeneuve to refuse battle, and by his conduct of his own column he had deprived him of any opportunity to attempt a counter-stroke.

In the short time of three weeks Nelson inspired his officers and men with a faith, not only in their leader but in themselves and one another, which nothing could shake. But over and above that his peculiar greatness lay in the fact that, having given his followers that confidence which begets initiative, he devised for them a plan of battle which gave that initiative full scope.

APPENDIX

CASUALTIES AT TRAFALGAR

The table is arranged to enable comparison to be made between the losses of the ships which were engaged with one another.

¹ Nicolas, *Letters and Despatches of Lord Nelson*, i, 397.

² The "Dreadnought" could fire three broadsides in $3\frac{1}{2}$ minutes. The rate of fire in "independent" was two rounds per minute.

³ Nicolas, *ibid.*, iii, 260.

⁴ Nicolas, *ibid.*, vii, 42.

In the case of the Combined Fleet it is not always possible to distinguish between losses in the battle and losses by shipwreck afterwards.

BRITISH FLEET.			FRENCH AND SPANISH.		
Ship.	Killed.	Wounded.	Ship.	Killed.	Wounded.
Royal Sovereign ..	47	94	Santa Ana ..	104	137
Belleisle ..	33	93	Fougueux ..	546	
Mars ..	29	69	Pluton ..	60	132
			Monarca ..	101	154
Tonnant ..	26	50	Algésiras ..	77	142
Bellerophon ..	27	123	Aigle ..	About 400	
Colossus ..	40	160	Bahama ..	75	66
			Swiftsure ..	68	123
			Argonaute ..	55	137
Achille ..	13	59	Montanes ..	20	29
			Argonauta ..	103	203
Revenge ..	28	51	Achille ..	480	
Defiance ..	17	53	Principe de Asturias ..	54	109
Dreadnought ..	7	26	San Juan Nepomuceno ..	103	151
Thunderer ..	4	12	San Ildefonso ..	36	129
Defence ..	7	29	Berwick (drowned) ..	About 500	
Polyphemus ..	2	4			
Swiftsure ..	9	8			
Prince ..	0	0			
Victory ..	57	75	Bucentaure ..	197	85
Temeraire ..	47	76	Redoutable ..	490	81
Neptune ..	10	34	Santisima Trinidad ..	216	116
Conqueror ..	3	9	Neptune ..	15	39
Leviathan ..	4	22	San Agustin ..	184	201
Britannia ..	10	40	Héros ..	12	46
Ajax ..	2	2	Rayo ..	4	14
Agamemnon ..	2	7	San Francisco de Asis ..	5	12
			San Justo ..	0	7
			San Leandro ..	8	22
			Indomptable (drowned) ..	About 400	
Africa ..	18	37	Intrépide ..	About 250	
Orion ..	1	21			
Minotaur ..	3	20	Formidable ..	22	45
Spartiate ..	3	17	Scipion ..	17	22
			Duguay-Trouin ..	12	24
			Mont Blanc ..	20	20
			Neptuno ..	38	35

DISCUSSION.

ADMIRAL SIR HOWARD KELLY: After the most illuminating lecture which we have just heard, there is very little for anyone else to say, but there is one point with regard to the plan previous to the battle which I should like to mention. I think I am right in saying that Villeneuve's fighting instructions were issued fifteen days before the action, and Nelson's memorandum only twelve days before, so that Villeneuve had very good advance information.

Another point is a psychological one. It has always seemed to me that one of the reasons for the battle of Trafalgar being fought was on a question of *amour propre*. You all know that Rosily was appointed to relieve Villeneuve, but Villeneuve was never told officially; Rosily was to arrive at Cadiz and Villeneuve was to go. A friend of Villeneuve, however, told him that he had seen Rosily in Madrid bound for Cadiz; that, I think, forced Villeneuve to make up his mind to take his fleet to sea at all costs before the arrival of Rosily to try to preserve his honour.

With regard to the battle itself, I should also like to pay my tribute of admiration to Captain Lucas of the "Redoutable"—"the Redoubtable Lucas" as he was called afterwards—for his conduct of his ship. When he saw that Nelson had put his helm up and was going to cut through under the stern of the "Bucentaure," he put his jib-boom over her poop to prevent the "Victory" going through. The "Redoutable," of 74 guns, fought two ships of 198 guns—the "Victory" and the "Téméraire," for three hours. The "Victory" did not get free of her until 3.30, and the "Téméraire" until 7 p.m. in the evening. The result can be gauged by the number of her people killed.

There is one point on which I do not agree with the Lecturer, and that is with regard to the squadron of the van. I think that Dumanoir had no intention of fighting, and did not fight. The two of his ships that did were the "Intrépide" and the "Neptune." Dumanoir asked them where they were going, and they said "We are going into action." They stood into action, fought gallantly, and were both captured. Dumanoir did eventually tack, but he never got within range of any ship, and he escaped to the Northward, only to be engaged and captured off Ortegal by Strachan. He was court-martialled afterwards and, by one of the greatest scandals of French justice, was honourably acquitted.

THE CHAIRMAN:

The temptation to follow such a very interesting lecture and to interpret all the lessons that we can learn from this great battle and from the greatest of all seamen as they might apply to modern conditions and possibilities is very great, but I think that I will not fall; I will reserve that, perhaps, for some future occasion at such a place as Greenwich, where the younger generation are more represented than they are this afternoon. For the moment, I will speak only of Nelson himself.

What was it that made this man pre-eminent among his fellows? It was not great brains—no one would speak of Nelson as being a man possessing that rather invidious quality of cleverness. It was not great technical skill—there is a story—it may be apocryphal or it may be true—that Nelson, seeing the Officer of the Watch bungling the handling of the ship in some manoeuvre, tried it himself and, having equally made a mess of it, made some petulant gesture and left the deck. It was neither of those characteristics. It was essentially his great vision, his wonderful confidence—not over-confidence, but wonderful confidence—in himself,

and his power, as the Lecturer and others have said, of putting that confidence into his brother officers. It came from those two invincible qualities—courage and love of country; and on an occasion like this, small though our numbers here may be, on the day before the anniversary of Trafalgar, one may be allowed to say that it is a proud boast when one talks about belonging to the same country as Nelson himself. (Applause.)

I remember on one occasion Admiral Constance, who was a student as well as a great naval officer, asking me what I was reading. I replied that I was reading the Life of Lord St. Vincent, whom I admired greatly. He said, "Better than that, read the Life of Lord Nelson and all his despatches, for from that you will get not only an example but great inspiration." Only this afternoon, a man of great intellect said to me: "It is a curious thing; I have just read another Life of Lord Nelson. He never seems to represent to me quite the type of an English hero, as, for example, the Duke of Wellington." I said: "You make a great mistake. For one thing, Lord Nelson was unique, and for another, the Duke of Wellington—great man, great commander, great General as he was—was not, in the ordinary acceptance of the term, and as we speak of Lord Nelson, a hero."

We stand at this moment in a very difficult position. We see our sea-routes challenged by the making of certain bases by other countries. Fortunately, our people have again realized what the Navy means. Attempts to reduce it have been found to be wrongly conceived; wonderful ideals have been shown to be useless, and once again we can say that the Navy holds the predominant place in considerations of the defence of this country. For that we must be profoundly grateful.

I beg the Lecturer, on behalf of this audience and of the many others who will come to see and admire and learn from the model, to accept our warm thanks both for the work which he has done and for the interesting afternoon which he has given us. I should like at the same time to thank Colonel Harold Wyllie and Mr. Hills, and if it is not an impertinence for a retired Admiral to offer thanks to so august a body as the Admiralty, I would also thank them very much for the material assistance which they have given us in correcting the model, so that from his eminence Lord Nelson can look down and see that, as far as possible, his plans and their execution in this great battle are now correctly presented to the people of this country.

ADMIRAL MARK E. F. KERR, who proposed the customary vote of thanks to the Chairman, said: We have at last in this building a correct representation of the battle of Trafalgar, and we are very grateful to our Chairman for what he has done to bring this about, and also for the kind things he has said about those who have helped, and for the way in which he has commended the Lecturer for the very interesting lecture he has given us, from which all of us, however much we have studied Lord Nelson, must have learned something.

THE TRAFALGAR MODEL IN THE ROYAL UNITED SERVICE MUSEUM AND THE ALTERATIONS MADE IN 1937

THE Institution's model of the Battle of Trafalgar was constructed by Mr. Thomas D. Deighton—Model Maker to the Prince Consort. Mr. Deighton worked under the direction of a committee appointed by the Council of the Institution; but there appears to have been considerable disagreement in regard to the positions of the ships and other details before the model was finally completed in 1862.

One of the worst defects was that all the ships had their yards squared; this made quite unintelligible the development of the great plan of battle which the model was intended to illustrate. Again, the positions of most of the ships were wrong. The moment depicted was when the "Victory" was breaking the line; but the ships of Collingwood's column were more or less in the positions they occupied some twenty minutes earlier, although too close together, too much in line ahead, and too far to windward. The positions of most of the French and Spanish ships were also incorrect.

It is only fair to the original committee to say that since the date when the model was completed a great deal of information from French and Spanish sources has come to light. For example, in 1905 the Spanish Government presented the Admiralty with copies of the diagrams prepared under the direction of Escano, the Chief of Staff at Trafalgar. These clearly show Collingwood's ships in a loose line of bearing and Nelson's ships in a succession of groups. In 1906 Mr. Edward Fraser's book, *The Enemy at Trafalgar*, gave us a series of views of the battle through French and Spanish eyes. In 1907 Colonel Desbrière's *Trafalgar Campaign* gave us for the first time the official reports of the French and Spanish officers. An English translation of this valuable book by Miss Constance Eastwick was published in 1933.

That something was amiss with the description of the battle accepted in this country became obvious in 1899, when *Logs of the Great Sea Fights* was published by the Navy Records Society, under the editorship of Admiral Sturges Jackson. In the same year Admiral Colomb, in an article in *The United Service Magazine*, claimed that Nelson attacked in

line of bearing. Mr. Carr Laughton, in 1901, came to much the same conclusion. In 1905 *The Times* published a series of six special articles on the battle. In 1911 Admiral Mark Kerr, writing in the *Nineteenth Century Magazine*, also claimed that the British divisions made their attacks in lines of bearing in close accordance with Nelson's Memorandum, instead of in the columns shown in the original arrangement of the model and in most of the published plans.

In 1912 the Admiralty appointed a committee to examine and consider the evidence relating to the tactics employed by Nelson. It consisted of Admiral Sir Cyprian Bridge, Admiral Sir Reginald Custance and Sir Charles Firth, with Mr. W. G. Perrin as secretary. Plans and other information were obtained from the Ministry of Marine in Paris by Admiral Sir Howard Kelly, then Naval Attaché. The positions of the British ships at noon on 21st October were worked out by Captain T. H. Tizard, R.N., from the logs, journals and other first-hand information. The Committee stated in their report that they did not regard the Institution's model as an altogether accurate representation of the battle. Captain Tizard did in fact try to work out proposals for correcting it, but came to the conclusion that it would have to be rearranged completely. He has proved quite right.

But the Trafalgar Committee did not pursue their examination of the battle beyond establishing the positions of most of the ships at noon. Further investigations, upon which the recent rearrangement of the model has been based, were made by Rear-Admiral A. H. Taylor in 1929. These were also used for the panorama painted for the "Victory" Museum at Portsmouth by the late Mr. W. L. Wyllie.

In 1936 Admiral Sir William Goodenough, as Chairman of the Museum Committee, proposed to the Council that the model should be re-rigged and restored, and a Sub-Committee was formed consisting of Admiral Goodenough, Rear-Admiral A. H. Taylor, Lieut.-Colonel Harold Wyllie, and Captain E. Altham, R.N., the Secretary.

The Institution is much indebted to the Lords Commissioners of the Admiralty for a special grant of £100 towards the cost of the work, and for giving the Sub-Committee access to the papers of the Trafalgar Committee.

All the ship models needed a "large repair" and, in order to allow the yards to be braced up in their correct positions, nearly all had to be re-rigged; the sails had to be renewed and the hulls repainted. In order to correct the position of the ships, the "sea" had to be relaid, which meant arduous and trying work inside the glass case. The sail carried and the state of individual ships were carefully checked from

the records and from contemporary pictures and drawings at the National Maritime Museum. Smoke, splashes and shot holes in the sails were put in to give a livelier representation of the fighting and to indicate what ships were engaged or under fire. The banks of smoke as depicted are not nearly as large or as dense as they must actually have been, but they give a rough idea of how long ships had been engaged. Finally, a direction post has been put up in the centre, giving the points of the compass, the direction of the wind, and the bearing and distance of Cadiz and Cape Trafalgar.

The whole of this work of reconstruction has been admirably carried out by Mr. F. E. Hills under the close supervision of Rear-Admiral A. H. Taylor.

SCIENCE AND FUTURE WARFARE

By CAPTAIN J. B. S. HALDANE, F.R.S., late 3rd Battn. The Black Watch,
Professor in the University of London.

On Wednesday, 13th October, 1937, at 3 p.m.

FIELD-MARSHAL SIR ARCHIBALD A. MONTGOMERY-MASSINGBERD,
G.C.B., K.C.M.G., in the Chair.

THE CHAIRMAN : I do not think that Professor Haldane needs any introduction from me to a gathering of this kind. I would only remind you that, although he is now a very distinguished Professor, during the War he played an equally distinguished part as a regimental officer in the Black Watch.

LECTURE.

I WANT to begin by dealing with some illusions. You have only to read the books which are constantly being published, whether by Mr. H. G. Wells or Mr. Michael Arlen or Mr. Olaf Stapledon, to know the terrible things which are going to happen in future wars. Among other horrors, there are to be explosives which will be very much worse than anything we have at present. Now, it can be said at once that that is nonsense : we know, on theoretical grounds, that there is an upper limit to the amount of energy which can be put into a given weight, and we know that we are fairly near that limit already. We might get a small percentage more without losing stability, but we are not going to get any explosives enormously more efficient than we have at present.

Again, some time ago—it was before the Great War—Mr. H. G. Wells alluded to bombs releasing artificial radio-activity. We know enough about that, now, to realize that if we could get out of an engine weighing half a ton one mouse power by artificial radio-activity, it would be very good work, and in practice we are certainly not going to blow up the world with it within the next few centuries.

We also hear about terrible new gases. It is probable that we have not completed the list of possible poisonous gases or rather, let us say, poisonous volatile compounds, because many of the so-called gases are liquids at ordinary temperatures. Nevertheless, I do not believe in the probability of anything very much worse than mustard gas, for a very simple reason : in order that a chemical compound may have an appreciable vapour pressure, that is to say that an appreciable amount of it

may get into a given volume of air, it must have relatively small molecules; there are plenty of large molecules which have not yet been made, but large molecules do not volatilize, and the majority of small molecules which are at all likely to volatilize are already fairly well known. It is worth pointing out that mustard gas, which was undoubtedly the most efficient weapon of that type used in the late war, was first described in a very rough and inaccurate way in the Fifties of the XIXth Century, and was prepared fairly pure and fully described by Meyer in 1886, and that between 1886 and 1917 nothing worse was discovered. I do not say that nothing worse ever will be produced, but I say that in view of the simple fact which I have stated it is *unlikely* that anything much worse in that line will be made. Therefore, when one reads in Mr. Wells' *The Shape of Things to Come* about chemical compounds which will render large districts uninhabitable for many years, one pays a tribute to his imagination, but not so great a tribute to his knowledge of organic chemistry. I believe that prophecies of that kind are based on two romantic illusions: first, the romantic illusion of some great new scientific principle which will be immediately applicable to war; and, secondly, the illusion of the great man who at his country's call suddenly produces something which is going to win a war. It is worth pointing out that anything from five years to two generations usually elapses between the discovery of a really new scientific principle and its practical application either to industry or to war.

Then there is the bogey of microbic warfare—the use of diseases as weapons. It is perhaps worth noticing that, under one of those Conventions which many Governments to-day do not take seriously, bacteriological warfare is forbidden. It is also worth noticing that that Convention is remarkably loosely drafted. Those diseases which would be mostly likely to be of use in future warfare are not actually caused by bacteria at all, but by other forms of micro-organisms, so that any Power which used them could claim that it was acting within the scope of International Law. I am very doubtful whether, at the moment, any possible method of attack by disease germs would be anything like as efficient as high explosives. It is possible that pneumonic plague might be disseminated by aeroplanes, but that is a very much more difficult thing than it sounds. Anyone who has been at all in touch with recent technical developments knows how difficult it is to create a fine dust or smoke, and that nearly all the methods of doing so involve a fairly high temperature—a temperature quite high enough to cook any disease germs. On the other hand, it is reasonably probable that some biological methods will be used. It would be very surprising, for example, if insect pests, such as the potato beetle, were not introduced into this country by hostile aeroplanes in the course of a future war.

The potato beetle would not cause a famine, but it would cause a certain amount of trouble and keep a certain number of people busy who could be used for other purposes. On the other hand, it is quite possible that forty years or so hence there will be effective biological weapons. We are just beginning to find out something about the nature of ultra-microscopic viruses, as they are called; they are things very much smaller than bacteria which cause air-borne diseases, such as smallpox. It is conceivable that such viruses might be used as a weapon; it would, of course, be necessary first to vaccinate one's own population against them, and only after that would they be spread among the enemy. Personally, I should be very sceptical as to the success of such a programme, if only because these viruses often change their nature in the course of an epidemic, and even vaccination against smallpox, which has been the practice for more than a century, is by no means 100 per cent. efficient now. So much for some illusions.

What are the real functions of the scientist in connection with a future war? I think we may classify them under four heads: first, the improvement of the existing technique of fighting; second, the invention of new methods as, for example, the invention of gas warfare in the Great War; third, the countering of new methods as, for example, the counter-measures which were devised against gas and against submarines; and, fourth, the invention of novel methods of passive defence against relatively old methods of warfare as, for example, the devising of types of buildings which would stand up to aerial bombardment or the rendering of this country self-supporting in case of blockade by the production of synthetic food or, if not of synthetic food, of food derived from wood and other raw materials which are available in large quantities.

Let us take, first, the question of the improvement of the existing technique of fighting. Improvement is generally a very slow business after the first few stages. One gets a gain of 1 per cent. efficiency here, 2 per cent. there, and so on; and that kind of work requires a very methodical type of man with works experience rather than laboratory experience. It is notorious that in order to get such things as slight improvements in a gun or to an aeroplane, one has to try the thing out on a full-sized apparatus; laboratory experiments may be a guide, but they will not give anything like certainty. This work, then, requires a scientist with a great deal of experience of the weapon on which he is working—a man who is careful and methodical, but perhaps not very imaginative.

The production of a real novelty requires imagination combined with a high degree of intelligence; in fact, it requires what is generally

called genius. That is something which is very rare and it is certainly not on order ; one can usually get a competent scientist, but one certainly cannot be sure, nor is there any marked probability of getting a man with the genius required to produce a weapon of a new kind.

With regard to the third heading—the improvisation of defence against new methods of attack, I think we have available to some extent the kind of men we want. The problems which are set by a new method of attack are not absolutely unlike the problems with which an academic scientist has to deal in his laboratory. He asks himself first "What is happening?" and, secondly, "How can we control it?" The methods which are first devised will, no doubt, be crude. The methodical man will come along and make them considerably more efficient, more fool-proof, cheaper, and so on. Nevertheless, the academic laboratory man is likely to be better than the technician at this work in the first few months. I saw a little of this kind of work during the late war in connection with the first German gas attacks in April, 1915. My father was sent over, and his first question was: "What gas are they using?" From the description given by the people who had suffered from the attacks and also from their symptoms, he decided fairly soon that the gas was chlorine. His next question was how some sort of improvised defence against it could be produced. He called a number of his colleagues together, and got me out of my nice comfortable trench near Neuve Chapelle, where I was enjoying myself commanding a trench mortar battery, to an improvised laboratory at St. Omer, where there were various colleagues of his. One of them, I think, was a Quaker; but it did not make any difference; we were all pushed, one after another, into a room with a moderate concentration of chlorine in it, wearing various things over our heads. Some of them kept the chlorine out a little better than others; none of them was very efficient, but within a few days we had at least a primitive sort of respirator which would keep out most of the chlorine. I may add that those experiments saved my life, because I happened to have one of the less efficient respirators tried on me; I did not get gassed, but I got remarkably short of breath, in consequence of which I was unable to run through a barrage when I next went to the front and was wounded while getting through it, whereas those who got through it were almost all killed by German machine guns later on.

Now it was fairly obvious that the kind of respirator which my father managed to rig up was not very efficient, and he recommended a box type of respirator. That was turned down, as you know, and cloth helmets impregnated with sodium phenate and similar compounds were used, which were not particularly efficient. It was thought

that the box respirator would take too long to make and that it was merely a scientist's idea of what should be used. My father was opposed to the use of gas as a counter-measure against the Germans, but he said : " If you must use it, why not use dichlorethyl-sulphide, which will blister people's skins even if they have got respirators which will keep it out ? " He was told : " We do not want to blister people, but to kill them." In consequence of that, dichlorethyl-sulphide was not used until the Germans started using it against us in 1917.

Again, let us take an entirely different line of defence. Academic people—one might almost say grossly highbrow people—were utilized with very great effect by the Admiralty during the late war. The kind of people who spend their time doing crossword puzzles, acrostics and things like that, turned out to be the only people who were capable of dealing with the German naval code. They have a kind of perverse ingenuity, a sort of intellectualism entirely divorced from practical matters, to the general despair and contempt of practical men ; nevertheless, just for that reason, those people were able to cope with the problem of decoding the German radio messages, and I am told that they coped with it very efficiently. It is worth pointing out that these kinds of people—both the highbrow crossword experts, on the one hand, and academic scientists like my late father, on the other hand—would be absolutely incapable of fitting into the peace-time discipline of the Services : they often forget to shave ; they frequently forget their ties ; and they show all the classical signs of inefficiency. Nevertheless, I would humbly suggest that the Services should not despise them—they have their uses.

Now suppose we look at the existing technique of war from the point of view of a person four or five hundred years hence. I am not going to pass any moral judgments, I am not going to say that such a person would say that all war was wicked. I am not going to say whether he would agree with our Chairman that, owing to the activities of scientists, war has become much more barbarous ; that is a matter of history, but when we recall the fact that during the IXth century every town in France was burned at least once, it seems questionable whether war has really become very much more barbarous in the intervening eleven hundred years. But I want to deal with the matter from the purely technical point of view. I think a man four or five hundred years hence would be amazed at the curiously conservative character of our weapons ; he would be astonished that various principles were not applied which, from his point of view, might have been applied without difficulty. I think the reason for a certain stagnation in military technique is a double one. The principal reason is that new weapons are of remarkably little

value in their early stages ; for example, at the present moment I think it is highly probable that a gun is by no means the ideal weapon for launching projectiles ; for one thing, a heavy gun wears out extraordinarily quickly, as you know much better than I. What alternative method would be better I do not know ; but it is highly probable that some magnetic method would be more satisfactory. But it is quite certain that in the first ten years of development of an alternative propellant method the weapon would be considerably less effective than any existing gun, and even after twenty years it would probably be more cumbrous than a gun, though it might discharge more projectiles per minute and would almost certainly last longer. It would be suitable, perhaps, for anti-aircraft work in connection with towns, and possible for coast defence and so on. It would be perhaps another twenty or thirty years before such a weapon could really compete with a gun for mobile work. Outside the field of war that sort of thing does not very much matter. The first motor cars were enormously less efficient than railways and, seeing how frequently they broke down, it is not at all certain that they were any more efficient than dogcarts. Nevertheless, people used them because they were interesting toys, and they were gradually developed and became practical. There is apparently no way of developing these embryonic inventions more quickly, and it might be a futile thing to do, because it may be that the international spying systems are so efficient that the early stages of research on any such weapon would benefit potential enemies as much as the soldiers of the country which started them.

The second reason for a certain stagnation in military technique is, I think, the conservatism of the average officer, which is possibly a necessity of his profession. For example, in 1913 one of the higher officers in the Black Watch constructed a few rather primitive hand grenades with time fuses and carried out a few experiments with them. He was regarded by the other officers, and probably by the men, as a bit cracked and very possibly an anarchist. You will remember that the Germans did not mass big reserves behind their first gas attack in 1915, which, however, gave them the biggest hole in the Western Front that they got before March, 1918. They regarded that gas attack as a diversion while their main attack was made in Galicia. It is perfectly true that a new weapon may be a gamble, but any battle in modern war is to some extent a gamble. So much for generalities.

If you had a better equipped person to deliver this lecture, he would be able to suggest more important lines for research than I can, but, apart from detailed technical improvements in weapons, I should like to suggest the following. I do not know whether any of the Services from

time to time get hold of a good human physiologist from a laboratory and employ him for a year or so, but if so, I do not hear very much about it. My father was occasionally employed in that way, though not on full-time work. He managed, for example, to revolutionize the diving technique of the Navy and did a good deal for its submarine technique in the years before the War. I think there has been far too much concentration on the mechanical side and far too little on the human side of war by those who think scientifically. The man who wins a battle is first of all the man who does not become a casualty, but, secondly, he is the man who under terrific strain can keep going for an hour longer than his opposite number. How much actual study has been done on such questions as the physiology of fatigue in men driving tanks or lorries on rough ground? The busmen who recently went on strike in London complained that they suffered from stomach trouble very much more than other people, apparently owing to the vibration. I do not know if it is true; but certain preliminary evidence would suggest that it is true. Do we know much about the effects of vibration in mechanical transport and tanks on the soldiers in them, and has any really systematic work been done to deal with the question? No doubt the R.A.M.C. have done their best, but it must be remembered that a doctor cannot, in general, be very much of a specialist, and that the laboratory worker, although, as I have said, he shows such signs of inefficiency as not putting on his tie, may have just that touch of specialization which will enable him to solve a physiological problem of that kind. It is quite clear, I think, that a different type of fitness is needed in a mechanized force from that which is needed in a force whose members have to proceed by the power of their own muscles.

Again, let us take such an elementary thing as the sights of rifles, machine guns and various other kinds of guns. A great deal of work has been done on them, no doubt, by people who are physically trained, but, among the half dozen or so experts on the physiology of human vision in this country, I do not know of one who has been taken away from his ordinary work for a couple of years and set to deal with this particular problem. It may be that I am misinformed on the subject. I have little doubt that such people have been consulted, but to consult a person is one thing and to put him on to a piece of work for a considerable period is another thing. It may be that such a person could do nothing, that the couple of thousand pounds, let us say, spent on his salary would be completely wasted; but it seems to me that gambles of that kind are at least worth considering.

I should like to pay a tribute to the excellent physiological work which has been done in connection with the Royal Air Force, which

owes a great deal to Wing-Commander Flack—a professional physiologist who went from the laboratory into the R.A.F. medical service. I sometimes wonder whether the Army and the Navy are equally well served.

Secondly, a great deal might be done in the way of an experimental approach to passive defence problems ; for example, the problem of the best type of ferro-concrete building to resist bombs. There are certain fairly obvious principles which may be well known to military engineers and which I see no point in mentioning in public ; they are probably applied to fortifications, but they are certainly not applied to the large majority of the ferro-concrete buildings which are being put up in London to-day and which are likely to be the best shelters that we Londoners would have in the event of an air raid. I should like to ask those in authority (though I do not suppose I shall get an answer) how many ferro-concrete buildings have actually been bombed from the air for the purpose of experiment, in the same way as old warships are occasionally shelled or torpedoed. As a mere civilian, I may attach undue importance to that question ; nevertheless, as we shall see later, passive defence may be of considerable importance.

Finally, there is the general scientific approach to passive defence. There is the question, for example, of shelters for London. The hard fact remains that at the present moment Valencia is very much better off than London in the matter of bomb-proof shelters. There are in Valencia fairly modern bomb-proof shelters for the majority of the inhabitants, who now number, I think, about 800,000. I do not say that all those shelters would stand up to a direct hit from a 500-lb. bomb, but they are very nearly bomb-proof. I believe that that sort of thing is impossible in our own towns, not so much for technical reasons as for political reasons. The land would have to be compulsorily acquired, and that seems hardly possible on a large scale in peace-time as long as land is privately owned. About 10,000 shelters would be needed for London—possibly more—and the cost would undoubtedly run to several hundred million pounds. It seems probable that this could not be done in peace-time under our type of social organization ; but it is not very reassuring to us civilian Londoners to know that the anti-aircraft ground defence is in the hands of Territorials well below strength and equipped, mainly at any rate, with guns that were designed in 1913 and later adapted for anti-aircraft work.

Similarly, with regard to the problem of food storage : before the War, Professor Ramsden, Professor of Biochemistry at Liverpool University, advocated the storage of sufficient wheat to last the country for a year, but he was regarded as ‘ cracked.’ It is fairly clear, I think, that

a reserve of that type would have meant that the country would have been in very much less danger at certain critical periods of the submarine war. It is thought by many people that national defence cannot be organized as a whole except under some form of socialism and, if that is so, many fields of applied science, for example, food storage, cannot be tackled. In the Fascist States there is undoubtedly a considerable measure of national organization, but it would appear that there is over-emphasis on armaments. Most German scientists with whom I have talked recently are remarkably pessimistic as to the possibility of the German food supply holding out in the event of a war which was at all prolonged, in view of the very inadequate food supply of their country at the present time, and they state that not very much is being done in the way of scientific research designed to improve the existing food supply. On the other hand, research in the various branches of science concerned with armaments is apparently being carried out on a very much larger scale than in this country. In my opinion, there is a good sporting chance that Britain could be made to a large extent independent of food imports by some technique for producing sugar from wood or starch from wood. It is important to realize that sugar can already be produced on a laboratory scale; but the problems of doing it on a works scale and without a very large wastage have not yet been overcome. It is also clear that the cost of research on the subject would probably run into several million pounds, and it is possible that such research would be completely fruitless. I would point out, however, that if the research were successful a very large number of British cruisers would be set free from convoy duty,¹ that a modern cruiser costs well over a million pounds, and that it may be sunk by a single mine. I would therefore suggest that possibly research on such a subject would be no more speculative than the building of cruisers.

Finally, I want to speak about the possibilities of closer touch between scientists and the Services. That, I believe, is the most important contribution I can make to this discussion. In the first place, I think that more officers should try to keep in touch with the developments of science, and not merely with the developments in sciences which are of obvious military value at the moment. The Services must try to realize what we scientists are doing. I am out of touch with conditions in the Army now, but I believe that Army officers who wish

¹ The number of cruisers required for the protection of our sea communications in war is largely dependent on the length of these sea routes on which we will have to rely for the supply of many vital commodities besides food. Even if we could be made far more self-contained than we are in regard to the latter, there could be no question of any reduction in our existing cruiser strength or in the number we are likely to possess in the near future.—EDITOR.

to go to some foreign country and learn the language get leave to do so, and that they get an increased allowance for knowing a foreign language. I would suggest that the acquisition of knowledge in some branch of science might be quite as useful as the acquisition of a foreign language, and that the Army and the other Services might make special conditions for officers who wished to take a course not merely in some form of applied science, but in some fundamental branch of science. This would have the effect of bringing officers into touch with actual working scientists and with the progress of science. Much of what they would learn would be irrelevant, but so perhaps may be a knowledge of, let us say, Lithuanian. It is quite possible that in the next war the British Army will not have to fight either with the Lithuanians as allies or against them as enemies; nevertheless, it is regarded as worth while to learn their language. Almost any scientific knowledge may turn out to be valuable. Let us take something highly improbable—entomology, the branch of biology which deals with insects. It is quite possible that insect pests will be used in the next war. The Germans may drop potato beetles on us or the French may drop them on the Germans. Secondly—and this is very much more serious—it has been suggested by many students of tropical diseases that if mosquitoes carrying yellow fever once got a foothold in India, there would be an epidemic of yellow fever overrunning the whole country. They have not got there yet—they are domiciled only in Africa and America. Nevertheless, from what we have seen of the behaviour of certain Powers in recent wars, I do not think it would be beyond them to introduce an epidemic of that kind if they wanted to paralyse the Indian Army. I am not going to suggest that it would be the job of any soldier to go out and "swat those flies," but I do suggest that it may be extremely important to have on the Imperial General Staff or at its disposal some officer who is in a position to say "This idea is an impossibility," or "This idea is a possibility, and it is worth devoting a certain amount of the national effort to counteract it." It may be that I am grossly underestimating the knowledge which exists in the Services, but I think that a little more would probably be valuable.

The second question is how to utilize our scientists during the next war. In the first place, I should like it to be laid down as a principle that no scientifically qualified man should be put into a non-specialized job. That sounds fairly elementary; but take my own case: I joined up as an infantry officer in August, 1914; I was an infantry officer right through the War, and I took part in the present war in Spain, where I had a very happy time in the trenches with the British battalion. That was all right for me, but it seems to me at least arguable that, from the point of view of the country, my services between 1914 and 1918 might have been better utilized, because I was not really a very good infantry

officer, though I was all right at an academic job, such as teaching bombing. From the point of view of the nation, my abilities were very largely wasted and, of course, there are very much more serious cases than that. Moseley, one of our greatest physicists, who joined the Sappers and got a bullet through his head in Gallipoli advancing across the open, might have been of immense value in making technical improvements. In a future war it will be necessary, not so much to advise scientific men not to join up, as to keep them out and even throw them out by the scruff of the neck if we want to use their abilities, because the average scientist is very much like anybody else; he wants a spot of adventure and he will join up if all his friends do. Even a botanist, to take an example of a scientist whose job is some way away from war, has at least the habit of accurate observation, and he will become a technician very much more rapidly than a man with no scientific training.

Another point is the question of picking the men for the big jobs. Is there a roster of the brightest scientific men under forty—it is the men under forty who are the most adaptable? Do not, I beg of you, go for the “big noises”; some of the “big noises” in science never did any good work at all, and the majority of the others have not for some years now. By the time a man is a “big noise” he is generally past his best work. Remember that the best men are by no means always at the top. It is true that in our Universities there is little actual corruption, but there is a certain amount in some other scientific institutions. You will be unable to utilize the scientists of this country unless it is the business of some officers in each of the three Services to keep in touch with scientific personnel and so know whom to choose for the different kinds of work. It may be that all this has been done since the late war; it certainly was not done then.

Then there is the question of how you are to utilize scientists at the present moment, during peace time. Again you have to remember that they are curious people, with their own psychology. You may find them rather trying, and they may find you rather trying. There is another fundamental difficulty on which I should like to touch, and that is the difficulty of money. Scientists are invariably expected to give their part-time services free. If they do very well, they may be given some sort of present. My father received about £300 worth of silver plate from the Admiralty, but he was not asked whether he would rather have a new motor car. It is worth remembering that in London University, for example, very few professors get as much as £1,000 a year. These are people at the top of their profession, and they cannot always spare a very great deal of time. There is a political difficulty also. A few scientists, I am told, are absolute pacifists who would refuse to take

part in any preparations for war. I do not know any such myself, but I am told that they exist. There are also some who say they would not work for a Socialist Government (I mean a real Socialist Government), and there are others who might not work for the present Government, because they think it is not doing enough to protect British commerce, or for some other reason. I think that those objections would probably disappear in the event of a major war, and that they do not apply to the majority of scientists. Nevertheless, you will find that they exist.

Above all, I would beg of you, if you make any attempts to increase the touch between the Services and science, not to attempt to militarise science. I see that Marshal Badoglio has just been appointed head of the Italian Scientific Research Council. Italian science, except for one physicist called Fermi, is fairly bad already, and I think that Marshal Badoglio will probably make it just a little bit worse. We scientists, when we are acting as civilians, want to be left alone and allowed to pursue our own aims, which may appear to be unpractical. On the other hand, I should like to see a Director of Scientific Research in the Army, corresponding to the Directors in the other Services. I believe that the most important practical thing that can be done is to fill this gap between the Services and scientific work.

I must end on a note of apology for not making lurid predictions about the destruction of London. I do take the view that an air raid on London, in which, let us say, the Germans employed a large part of their air force, might kill fifty thousand people or so: that would be about as many people as died in London during the influenza epidemic of 1918 and 1919. I do not for a moment believe that such an air raid would kill millions of people. Calculations about gas are often based on ridiculous misconceptions. It has been pointed out with perfect truth that ten tons of gas would render the atmosphere poisonous over an area of several square miles if it were rightly distributed, but it is also true that one ton of bullets would destroy the whole British Army if they were rightly aimed. The question which we have to face is what is likely to happen in real life, because it is quite certain that a hostile air force would not be allowed to drop its bombs wherever it wished without interference. In my opinion, the question of whether a big air raid would cause panic on the one hand or a revolution on the other depends on the political situation. I may be prejudiced by my experience in Madrid whose citizens seem to me to be the toughest people I have ever met. They believe that their Government is doing the best it can for them; therefore they have not panicked and they have not risen against the Government. It may be that raids on London would cause a revolution if people took the view that passive defence had been

wholly neglected. That, however, is a political and not a scientific question.

I hope that the main point which will remain with you from this lecture is that there are possibilities for greater touch between the Services and the people who are actually advancing science in the Universities and other academic institutions.

DISCUSSION.

LIEUTENANT-COLONEL M. K. WARDLE : One hears a number of very gloomy prognostications about what would happen to the country if the Port of London were crippled, even to the extent of only a third of its capacity, and I should like to know whether this is something of a bogey.

MAJOR W. G. CARLTON HALL : I should like a little further enlightenment on three points.

The first is as to the probability of gas attacks from the air. I believe that, apart from the Abyssinian War, an attack from the air by gas has never taken place. In the Great War the gas attacks were either by cloud gas from containers on the ground or by shells from ground artillery. I have not heard that either side in Spain has even accused the other side of using gas. There was a report two days ago from China that the Japanese were using gas, but the allegation apparently referred to ground artillery. Can the Lecturer say how many gas casualties were actually dealt with by the foreign Red Cross units in Abyssinia, what proportion of those casualties proved fatal, and whether it is certain that the gas causing them came from aircraft or from ground artillery ?

My second question is this. I believe that any poison gas to be effective must be heavier than air. Does it follow from that that the safest place in a gas attack would be the top floor of a house ?

Thirdly ; I am extremely ignorant on all scientific subjects, but, supposing that poison gas and either explosive or incendiary bombs were dropped at the same time and place, how would they react on each other ?

COLONEL N. C. KING : I gathered from what the Lecturer said that gas is not a very great danger—although, of course, it is a danger ; but it seems to me that incendiary bombs, which I understand produce quite an extraordinary amount of heat, could be carried in very large quantities and might be sprinkled very easily all over London. If we had an enormous number of fires and possibly a certain amount of gas afterwards, is there anything which could be done to minimize the danger arising from these fires ?

MAJOR M. H. W. WEBB-BOWEN : Senator Marconi is said to have invented, just before he died, a ray which actually stops magnetos of motor cars and is said to have killed sheep at some distance away. Could the Lecturer tell us anything about it ?

THE LECTURER'S REPLY.

THE LECTURER : With regard to the question of crippling the Port of London, I have little doubt that the Port of London could be crippled to a considerable extent, but the point to be considered in regard to all these attacks on the civilian population is whether they would be worth while. I do not think that London would be starved out if the Port of London were crippled. It is perfectly clear that

the essentials of food for London could be brought in either by railway or by road. Crippling its port would make things uncomfortable for London, but the question is whether a hostile air force would not be very much better employed in attacking places of more vital importance, either where there were military forces or munition areas. My own view is that nothing that could be done to the Port of London would kill many Londoners outside the Port. There are more than a million people in Madrid; all the railways to it and all the main roads but one are cut. All the food has to be taken in through a by-pass because the last main road is under shell-fire, but the people, although short of food, are not starving. I do not think that the crippling of the Port of London would starve us, although it might make us a little unhappy.¹

Major Carlton Hall asked about the probability of gas attacks from the air. There is one essential way in which an attack on a given area by gas differs from an attack by high explosives or other weapons. If a hundred shells are put into a given area they will kill so many people, but if a thousand shells are put into the same area they will kill ten times as many, or perhaps only nine times, because some of the shells would fall in the same place. But suppose that a hundred gas shells are put into that area, they will make a few places deadly to people who have not got masks on, or a concentration of mustard gas might be so great as to blister everybody; but suppose a thousand gas shells are put over, or a thousand gas cylinders let off instead of a hundred, then the areas where the concentration is fatal will be much more than doubled. There will be a large additional area surrounding the zones of bursting of those gas shells where the concentration will come up to the lethal level or the concentration of mustard gas vapour will come up to the blistering level. If I let off my cylinders one after another, half a mile behind the lines, instead of there being a certain concentration of gas for five minutes which will give people a nasty cough, there will be a similar concentration for fifty minutes, which will kill them. Therefore gas is a very efficient weapon if one can get it fairly concentrated, but it is very much less efficient if it is scattered about.

I do not believe that an enemy dropping bombs on London would be able to put them where he wanted to put them, or that he would be able to say: "Here are a thousand bombs and we are going to drop the whole of them in the area just round Whitehall." He might drop them somewhere about London, but I do not think that he would be likely to get a large enough concentration of gas to make it more efficient than high explosives. High explosive bombs kill about as many people if they are scattered all over the place as they do when concentrated in one area, whereas gas is enormously more efficient when concentrated in one area. It is for that reason that I do not believe in the efficiency of gas as compared with high explosives on a town which has sufficient air defences, not necessarily to keep the enemy away but at least to prevent him dropping bombs exactly where he wishes. But I may be wrong!

With regard to Abyssinia; I certainly do not know that the Italians used gas, any more than I know about what has gone on in Spain, except the few things that I saw with my own eyes, and I do not quite believe all of them! But I do think it is highly probable that the Italians used dichlorethyl-sulphide as a spray from

¹ The Port of London "feeds" not only London, but practically the whole of the South and East of England and, according to expert authorities on the question of supplies and their distribution, the capacity of ports on the West Coast and of the road and the rail facilities from them would be quite inadequate as substitutes for the Port of London and its distribution services.—EDITOR.

their aeroplanes. I do not regard that as devilish. I regard it merely as dishonourable, in view of the fact that the Italians had signed a Convention which bound them not to use such substances in warfare.

Major Carlton Hall's third question related to the combined use of gas and high explosive or incendiary bombs. In my opinion, if there were a few good fires going in a gassed area, they would very rapidly suck the gas up and dissipate it in the upper atmosphere. Fires were actually used in the late war to dissipate gas clouds, though not very effectively; but a house on fire would suck the gas up, and that is one of the reasons why I think a decisive gas attack on London is rather unlikely. I think it is highly probable that gas will be used, and I think it will kill a good many people if we have an air raid, but I do not think it will wipe us out.

With regard to incendiary bombs, until recently I held the same view as to their danger as Colonel King has expressed, but I was amazed at the slight efficiency of the incendiary bombs which were used on Madrid. It is a striking fact that incendiary bombs were used to a considerable extent in the raids early in November and December, but in the raids which took place later in December and in January—some of which were fairly bad raids, four hundred people being killed and many more wounded in a single raid—incendiary bombs were not much used. That seems to suggest that in Madrid incendiary bombs were less efficient than was expected.

What I should like to know, and what I hope the authorities in this country do know, is how the proportion of wood in the houses in Madrid compares with the proportion in the houses in London. It is quite possible that incendiary bombs would be more effective in London than they were in Madrid. But it is a striking fact that in the last few raids on Madrid incendiary bombs were hardly employed at all. I would suggest that among the most efficient ways of dealing with such a danger would be to broaden drastically some of the streets of London so that fire engines could get to their goal at a reasonable pace. I was astonished at the efficiency of the fire brigades in Madrid, but it must be remembered that the streets of Madrid are in many cases much broader than the streets of London.

With regard to the ray mentioned by Major Webb-Bowen, which stopped motors and killed sheep, presumably it would be some kind of short-wave radio. It is perfectly possible to stop magnetos at a short distance if one has sufficient power. The question of the dissipation of such a ray is a matter for physicists. I am not a good enough physicist to be dogmatic about it, but I think one may say with some degree of certainty that a beam of the frequency which would be needed to stop magnetos would spread out to a very considerable extent in a very short time. As for killing sheep, I think that no physiologist in the laboratory has ever found any ray which will even kill a mouse at the other end of the table, except an inventor during the War; he managed to kill a mouse produced by himself, but he could not kill a mouse that somebody else brought in. I am not going to say that such a thing is impossible, but I would bet a hundred to one against it being true, and that is as far as one can generally go in scientific matters.

THE CHAIRMAN:

I should like to thank Professor Haldane very much for his very instructive and, may I add, humorous lecture, which I am sure we have all appreciated.

I should like to add a word to what he said about claims for a ray that will kill mice and other animals, because one of the cleverest impostures during the

War was carried out by the man to whom Professor Haldane alluded. I knew a good deal about it because it happened in the Fourth Army, of which I was Chief Staff Officer. I think I am right in saying that the man was a Corporal in the R.A.M.C. He had a very ingenious and inventive mind, and somehow or other he produced a number of photographs of the effects of a ray which he claimed to have invented and which showed all the details of a man's inside. He also claimed that the ray would kill mice. He imposed on the authorities so successfully that they gave him a sum of money, promoted him a lieutenant in the Army, and built a small laboratory for him in which he could carry on his experiments. It was not until some genuine scientist went into the details that they discovered that the man was a complete fraud, though a very plausible one.

I personally agree with Professor Haldane in his disbelief that anyone can invent such rays. I remember that when I was at the War Office, it would be reported about every six months that some person on the Continent had invented a ray that would stop an aeroplane in flight or a motor car, or would kill animals at a considerable distance. The two former may be possible, but I much doubt the latter.

Professor Haldane alluded to an opinion expressed to him that science had caused war to become more barbarous. I do feel that that is so, but I keep an open mind on the subject, because I know that he has produced many sound arguments to prove the opposite. The remark I made to him that I thought science had so far made war a good deal more barbarous, should perhaps be put in a different form, i.e., that science has put into the hands of ruthless nations the power of carrying on barbarous forms of warfare much more easily. My reason for saying that is what has happened in Europe, Africa and Asia during the last few years. To rely on the bombing of open towns and women and children to destroy the morale of your enemy is a barbarous form of warfare made easy by the invention of science.

I suggest that the question of whether science has made war more barbarous would be an extremely interesting subject for discussion in a place like this.

The customary votes of thanks to the Lecturer and Chairman were carried by acclamation.

SECOND PRIZE ESSAY (MILITARY), 1936

By BREVET LIEUTENANT-COLONEL G. C. SHAW,

Royal Army Ordnance Corps.

SUBJECT

"Tactical and administrative movements in modern armies have been radically affected by the introduction of the internal combustion engine. Discuss the possibilities of its use in the British Army in assisting to overcome the strength of modern defence and in countering the increasing threat of air action."

MOTTO

"Eheu, fugaces . . ."

THE problem before us is in two parts; and in discussing the possibilities of the internal combustion engine in assisting to overcome the strength of modern defence, and in countering the increasing threat of air action, the latter will be dealt with first. For, before it may attempt the first, it must pave the way for battle by overcoming the air threat to administrative movement, on which the outcome of battle rests.

THE THREAT FROM THE AIR

Let us first see what the I.C. engine may be confronted with in the aeroplane's threat, and then estimate its abilities to counter this. Air forces are, to-day, so much greater in range, in power, and in numbers, that offensive action can be pressed far into a hostile territory; while for shorter distances their rapidly increasing strengths point to the possibility of sustained action, which may for short periods even partake of the nature of an "air siege." In order to impede invasion or embarrass strategy, air forces will gain results more immediately profitable through attack on administrative movement at its main bases and on the supply routes linking these with the field forces, than on similar objectives still further to the rear, or even on the combatant troops themselves. In particular, any serious dislocation of the normal supply organization ahead of a main base, even for a short period, may have the gravest consequences for the force administered, on account of the light maintenance stocks customarily located, or in movement, between the base and its force. This margin is normally very small: for example, in supplies, five or six days' rations at most.

The air raider will study the transport "flow" of his enemy with a view to its interruption at the most vital points, such as junctions, bridges, and the like. The base covers a large area, and must needs be sited at, or near, a strategic centre which is a focus for a network of communications of all sorts. It is usually some coastal port or frontier town, permanent, well known, and the scene of much activity, and hence easily found and attacked from the air. Similarly, the lines of communications, the supply routes—road, rail, or waterway—ahead of it are fixed and well known, and so offer almost equal facilities for attack. That the hostile aircraft will devote the bulk of its attention to administrative movement and its supply routes, there can be little doubt, and the more rigid and permanent these are, the easier will be its task. The military literature of the air all leads us to this conclusion. Here is a sample extract taken from a work on the operation of air forces :

"The more an army is dependent upon fixed and limited lines of communications, the more vulnerable it becomes. Hence the need for increased mobility."¹

A friendly air force—we assume its presence—will doubtless at the outset of hostilities endeavour to attain mastery of the air. But, even if this happens, the administrative services of its land forces can still never be certain of immunity from air attack; while, if it fails, the base might well, at a time when its continued activity was essential to the force it serves, have to submit to an air siege and a consequent cessation of its vital activities. Administration may expect then to receive not only the first, but also the main, onslaught of a hostile air force; and yet, as embodied to-day in its long-established and cumbersome "layout" behind the field force, it presents to the air raider the easiest, most vulnerable, and most remunerative of targets.

PETROL-DRIVEN VEHICLES

For operations on land, the services of the I.C. engine are utilized almost entirely for purposes of transportation. We see it incorporated in various forms of M.T. vehicle, which fall generally into one of two classes :—

- (1) Specialist fighting vehicles, which may be armoured, like the tank, or unarmoured, like the wireless lorry; and
- (2) Normal commercial load-carriers, adopted or adapted for military purposes, such as the ordinary lorry or motor car.

¹ See *Basic Principles of Air Warfare*, by "Squadron-Leader."

For administrative movement the last category is everywhere to-day replacing the transport animal and cart. Its main advantages to the soldier, and its special attributes, are :—

- (a) Its economy in attendant personnel : one or, at most, two men may control many horse-power, pulling loads which, compared with those of horse-drawn transport in the past, are considerably larger and heavier.
- (b) Its mobility, which, for travel on the road is very high, and across country tends to increase yearly. The special design of the six-wheeler, and constantly improving design in the ordinary commercial four-wheeler, give a strength and agility unknown in the Great War. Improved engine cooling, low-pressure balloon tyres, high gear ratios, and other mechanical factors, all now make for increased powers in across-country travel. Within the term mobility, we may also rightly include the vehicle's capacity for instant starting—the quick unleashing of its mobility. The old horsed fire brigade was a marvel of keyed-up organization in the speed of its get-away on the fire-call ; but how much quicker its modern successor !
- (c) Its capacity as a weight-carrier. This fundamental characteristic and most valuable attribute has, from the military angle of its possibilities in strategy, been almost entirely overlooked—probably on account of its very obviousness in the world of everyday life. Yet, in the military sphere, its implications are far-reaching. They indicate—when realized, and so long as carrying capacity is coupled to mobility—the inception of a new era of warfare, in which the anatomy of war will revert, in its administrative aspects, to forms it assumed in the XVIIIth Century long before the foundations of administrative movement, as it is to-day, were first laid by Prussian staff officers in 1866.¹ History teaches that changes in strategical mobility have done more to change the face of war than any revolutionary change in weapons.

In the course of centuries, the armament deemed necessary for the soldier in battle has been piling up, until it has become too much for him, or his mount, to bear ; to-day, the soldier of an industrial civilization can carry but a fraction of the necessities of civilization's war. In

¹ See Pierron, who reveals the somewhat obscure origin in his *Stratégie et Grande Tactique*, Vol. I.

consequence, the ration-load borne by him or his beast has gradually had to be reduced, and the great bulk of it relegated to transport following in rear. What he once carried in his knapsack is to-day distributed, as so many successive days' rations, all down the supply route behind him; and a similar relegation to the rear has happened to the surplus armament and munitions, which he and his animal are unable to carry on their backs. This process has continued, until all power of independent march and manœuvre has been lost by the formation. A man-power force is indissolubly tied to its vital supply route. In the case of great forces of heavy man-power, this necessary evil has become accentuated, until the supply route becomes a never-ceasing stream of men, animals and supplies, flowing forward and back. Indeed, it has become almost an axiom that the administrative movement of an army must be a continuous and never interrupted flow from base to force. Such a vital umbilical cord has had to be, and was, guarded by the far-flung front of its advancing or entrenched combatant masses; its supply routes were permanent, and always filled; and they were heavily and meticulously organized. What an objective for the air forces of to-morrow—this organization! And one—be it noted—still with us, although deriving from a past of heavy man-power, devised for its colossal maintenance, and built up originally on the basis of animal motive power. Fortunately for administrative movement in the Great War the aeroplane had then not attained to anything like the efficiency, power and numbers, which another European conflagration would call forth.

Before considering how best the I.C. engine may step in to mitigate so grave a menace to administrative movement on the supply route, let us note some effects likely to arise from its aforementioned qualities, as embodied in the M.T. vehicle.

THE REPLACEMENT OF MAN-POWER BY THE MACHINE

We can surely assume that the time is not far distant when a Regular expeditionary force will be wholly carried on track or wheel, and will be in part mechanized and part motorized. In those of its units which are mechanized—its tank battalions, armoured car squadrons, and machine-gun regiments—the man-power is relatively small for the high fire effect it produces. Consider, for example, the Tank Brigade: how great the fire potential, and how small the personnel! Every introduction of a new model tends, still further, to reduce, in relation to its efficiency, the vehicle's attendant servants—a process, attested everywhere in the civil world of industry, where a new plant or machinery

lay-out is only justified, if it will do the same job with less men, or more work with the same men. Even in the motorized portion of our force, comprising bus and lorry-borne infantry, the steady increase in the number and efficiency of the power-tools of the soldier—machine guns, automatics, and other rapid-fire weapons—can only tend in course of time to a gradual reduction in the unit's personnel. Again, improvement in vehicle design leads to higher mobility, and this in turn will encourage a wider dispersion of units, until control by a commander—wireless notwithstanding—becomes more difficult, and demands smaller units. From every angle, a decrease in the size of the unit and its personnel seems foreshadowed.

The introduction of the I.C. engine has meant the gradual elimination of the horse; and with it will go also much of the bulky tonnage of the Great War—the mountains of forage and the loads of horseshoes, harness, and other horse gear. The soldier's own requirements—food, blankets, boots, clothing, and necessities—will also have dwindled greatly. The heavy necessities of static warfare, in the way of road metal, timber, concrete, sandbags, and barbed wire, will be conspicuous by their absence; for in operations of mobility there will be little place—anyhow in the opening phases of a campaign—for the trench and its cumbersome stores. There will remain, besides ammunition for the strictly mobile artilleries, in the main and pre-eminently, the very vital necessities of the machine—petrol, lubricants, and spare parts. But these, compared with the amorphous, fibrous, and bulky requirements of man and beast, although heavy, are compact and condensed. Even petrol, the bugbear of the modern supply officer, though bulking large in the administrative field on account of its primary importance and heavy tonnages, when compared with forage as an agent of motivity, does not show up alarmingly. Per ton-mile covered, the weight of it expended, if set off against the same necessary fuel for the animal, is small. To-day, it is transported in cans; and in consequence, as the 3-tonner carries a load of 700 gallons only, it is wasteful of both transport and road space, and offers a large and dangerous target to the aeroplane. The remedies will arrive, however, in the larger fuel tank of the vehicle and the bulk petrol carrier of commerce.

An analysis of the stores and supplies required by a normal division, comprising approximately 17,000 men, 5,500 animals, and 900 M.T. vehicles, will give some indication of the likely saving in tonnage, which would accrue on the abolition of the horse and also on possible reductions in man-power. Excluding its needs in ammunition and baggage, the daily "lift" to such a division, i.e., the load carried by

the Division Supply Company,¹ has been approximately 150 tons of all kinds, comprising :—

Hay and oats	...	...	...	...	53 tons.
Food and cooking fuel	...	...	...	...	54 „
Petrol	...	...	...	...	20 „
Lubricants	...	...	...	...	1 ton.
Ordnance stores	...	...	...	...	10 tons.
Other stores	...	...	...	...	12 „

It will be noted what a preponderating demand on transport food for man and beast have made. Large though the man's requirements in food bulk, they are overshadowed by those of the animal : for, in weight, the horse needs approximately six times as much as the man. Further, man and animal must eat, whether working or not, whether operations are active or quiescent ; while the I.C. engine, only when it is working. Thus, how much shorter the supply transport column of the future should be ! The reduction in the transport of maintenance brought about by the introduction of the I.C. engine into a combatant formation may be gleaned from a study of the campaign of pacification undertaken in the spring of 1934 by French colonial troops in the South-Western—and last “dissident”—districts of Morocco². There, in the round-up of mobile, elusive, desert tribes, long distances were covered by a mechanized formation, comprising 400 M.T. vehicles, which was easily maintained by a supply column of 17 transport vehicles only—and these carried water in addition to other necessities. The I.C. engine, by its employment as the motive power for a combatant force, will bring about a reversion to an older epoch of warfare, when war supported war more fully than it does to-day ; for the natural supply of the soldier—his water, rations, and cooking fuel—will be readily obtainable for the small personnel of the force, and his technical needs only will have to be furnished up the supply route from the base.

No matter how it be viewed, the introduction of the I.C. engine into the Army must bring about a big reduction in the administrative tonnages to be forwarded from the rear and the consequent transport for them ; no matter also what form administrative movement may take eventually, by the mere reductions attained in the personnel and tonnage requiring transportation, the objectives it will offer to the air raider can but be greatly lessened. Here, however, a proviso is necessary. The I.C. engine has been adopted as the medium of two military policies—mechanization and motorization. In the first, the machine, as in modern industrial practice, replaces man in mass ; in the second, the

¹ Recently replaced by the Supply Column.

² See the *Revue des Troupes Coloniales*, 1934, p. 337 et seq.

machine is merely an assistant to man in mass, an extra to the man-power formation of the past. The tank exemplifies the first ; and the bus, the second. An army cleaving to the first of these policies must of necessity present, both in itself and in its administrative movement, smaller, fewer, and less vulnerable targets to the hostile aeroplane, than one wholly, or even partly, organized in accordance with the second. An implementation of the latter, although undoubtedly constituting a tentative and evolutionary stage in development towards final and complete mechanization, must entail enormous difficulties in administration, besides presenting the aeroplane with the best of ground targets ; for the supply route must then carry, not only all the transport for the maintenance of heavy man-power formations, as in the past, but, in addition, that now necessary for a new host of vehicles. Yet the trend in development of the machine must inevitably swing more into line with the first of these policies than the second ; for, not only in the guise of the armoured fighting vehicle does the I.C. engine reveal most fully its military virtues, but the continued growth in the power and variety of the gun will call for its antidote, armour. A modifying factor in this swing of the pendulum to the left-wing policy will be, not so much the necessity for retaining the unarmoured infantryman for the occupation and consolidation of military positions, as for the purpose of subduing, or maintaining order among, a hostile populace. In this duty numbers, individual contact, and the personal dissemination of authority are necessary ; and particularly so in the military policing measures occasionally necessary in the many and varying parts of a wide-spread empire.

MOBILITY INHERENT IN THE VEHICLE.

The benefits accruing to the soldier from his new-found mobility, *vis-à-vis* his aerial opponent, are three :—

Firstly, the mechanized vehicle has so great a range and speed that by its use the soldier is enabled, if he so will, to dispense with the railway and its services for his strategical and administrative movement. In such a disuse of the railway the aeroplane is denied one of its most favoured objectives. As a supply route, and as a medium for administrative movement, it is fixed, fragile, and easily cut ; every bridge, every culvert, every junction, constitutes a potential source of danger to the force it feeds.

Secondly, the M.T. supply vehicle has a choice of roads, thus placing its aerial opponent in perplexity and making his task of interception more difficult : it may even, in favourable terrain, choose its path across country, so negating the value of the airman's map.

Thirdly, the vehicle's mobility to-day permits of a comfortable 70 miles per day, at an average of, say, 15 miles per hour. Similar distances of travel, which are perfectly feasible to-day, on the part of the fighting vehicle¹ mean not only long maintenance distances for administration to cover, but distances which rapidly lengthen. Over these, its transport columns must speed; but, in doing so, they will present, on their long uncrowded supply routes, fleeting targets very different to those seen on the short roads from railhead to force in the Great War, which were congested and encumbered with a never-ceasing, slowly-moving stream of men and animals. In brief, much longer distances will be covered by shorter transport columns in a much shorter time, thus making the task of the air raider more difficult. The M.T. column will further perplex him by its camouflage and simulation of loosely moving civilian traffic. The aeroplane may attack with gas, bomb, or machine-gun fire. Against the first, the mechanized vehicle, if enclosed, has a considerable degree of immunity; while, even if not, a relatively small personnel only is forced to submit to the menace. Should gas-infested areas have to be traversed, the speed of the vehicle enables these to be passed quickly. Lastly, the smaller the personnel, the less the chances of panic will be, and the less its ill effects.

THE WEIGHT-CARRYING CAPACITY OF VEHICLES

The M.T. vehicle is a powerful weight-carrier, and economical of attendant personnel, one or two men only being needed to handle loads of three tons or more. This economy in personnel, and also in the number of power-units employed, is to-day everywhere being extended, and the trend may be observed in the increasing employment of the larger vehicle, or lorry-train composed of two or more transport units. There seems, indeed, no reason, if they were ever required for the administrative work of back areas in war, why road trains might not be constructed to carry 50 or even 100 tons, with an attendant personnel of three men. Its capacity as a weight-carrier confers on the M.T. vehicle the second of its two major and abstract qualities—mobility and self-containment; and—it is worthy of note—strategical mobility in the past has invariably been highest when the studied self-containment exercised by the soldier, unit and formation has been greatest. Of this, the Napoleonic division and the Roman legion have been outstanding examples: their far-reaching powers of independent manoeuvre have never been exceeded by any other, or later, infantry formation. The military value of the quality of self-containment is perhaps even

¹ For simplicity we include, besides the A.F.V., all which are wont to carry or accompany the combatant.

greater for the fighting than for the transport vehicle. There are commercial vehicles on the road to-day which, handled by two men, can run with a pay-load of 15 tons at an average of 20 miles per hour from Edinburgh to London and back, without a refill of any necessity for man or machine. The trend of design in industry is markedly in this direction: it may be seen in the larger petrol tank which accompanies each new model; in more enduring material and greater reliability; while its effects are in evidence in every trans-continental lorry or motor car trial that has taken place of recent years. With these valuable qualities at his command, how may the soldier best organize administrative movement behind his swiftly speeding force? And in what form will it best counter the threat of air action?

SPECIAL CHARACTERISTICS OF FIGHTING VEHICLES

The answers to the above must hinge primarily on the requirements of the combatant portion of the force ahead, and these on the characteristics of the fighting vehicle itself, which, complete in its various components, animate and inanimate, becomes the Army's new supersoldier. Materially the fighting vehicle differs but in varying degree from its humbler relation in the transport: it may be armoured, and so impervious to small arm bullets; be tracked or run on six wheels, and so travel better across country; be fitted with special equipment, and so fulfil some particular function. But its main qualities are the same, those with which it is endowed by the I.C. engine—its great mobility and its power of self-containment. Its unit, self-contained for a period in its petrol, lubricants, spare parts, ammunition, rations, and crews, may go where it will; and is, for that period, dependent on no extraneous source of supply. It can cover long distances. Its mobility, coupled with its fire power, permits to its parent formation great dispersion; while its self-containment, if exercised, will ensure its maintenance. Yet, on account of its ultimate dependence on the base for its vital technical supplies, and in particular for its motivity supplies—petrol, which gives movement; lubricants, which permit it; and spare parts, which buttress it—the transport of these from the rear becomes all-important.

THE LAY-OUT OF ADMINISTRATION AND ITS MOVEMENT

The present system of administrative movement, founded on the motive power of the animal and the railway, is neither congruous nor appropriate to the swiftly moving operations of a petrol-driven formation; it is ponderous, meticulous, slowly organized, and offers the best of objectives to the aeroplane. If the I.C. engine is to give of its best

in foiling the rapidly increasing air menace, then the present staged system must go, and be replaced by something vastly more mobile, more elastic, and much simpler. There must be a clean sweep of all from the main base forwards: all the accumulated administrative ritual of all but a century; all the fixed cumbersomeness of Regulating Stations, Railheads, and Advanced Bases; the standardized and scheduled movement of Ammunition and Petrol Parks, and of Divisional Ammunition and Petrol Companies; and the stereotyped functioning of Refilling Points, Rendezvous, and Delivery Points. The umbilical cord of administrative movement must be broken, to give freedom of movement to war's new mechanized offspring, the mechanized formation, which can largely carry the substance of its lines of communications within itself. Prussian staff officers were able to foresee, in the years preceding the outbreak of hostilities between Austria and Prussia in 1866, the huge growth in armed man-power, and wisely devised the foundations of a staged line of communications, a *Service des Étapes*, to meet the necessities of armed masses.¹ This system, with added elaboration, we still have to-day, when everything must indicate to the soldier changes—due to the I.C. engine—more sudden and much more revolutionary than those which confronted those logical and far-seeing Prussians. Should the system remain, air fleets will certainly destroy it, and immobilize the forces it serves. Let us assume an I.C. engined force in which the fullest advantage has been taken of the great qualities in the M.T. vehicle: one to move swiftly and disperse rapidly over a large area; one carrying all it needs, for a short period, in unit and formation, yet subsisting on the country, where possible, to supplement its self-containment; one able to effect its own repairs by the replacement of spare parts; one, finally, in which the virtue of frugality has been inculcated in its personnel. Owing partly to the higher standards of living now prevalent, and partly to the influence of the static operations of the Great War, the soldier has grown to expect an ample scale of provision and comfort on active service. Should this expectation be met during the operations of a mechanized force, then the I.C. engine will not give the soldier of its best—mobility! The lorry offers him every inducement to avail himself of its tireless capacity for his comforts—and he is human. Yet, should he spurn the ancient virtue of frugality, then Mobility will also desert him, for her courtship has always enjoined self-denial.

CONVOYS

To maintain a mechanized formation as a force in being, and to ensure its power of continued movement, its replenishment will best

¹ See note 2.

be effected by the long-distance through convoy, which might well be born, but as a smaller unit augmented by petrol and ammunition sections, from the present Supply Column. The convoy would move when required from the rear and would trust, for immunity from air attack, to careful route selection, concealment by fog or darkness, or the skill of its anti-aircraft fire or that of its escort. Speed, evasion, concealment, and fire, would be the means employed to counter the air threat. The word "convoy" conjures up a formidable picture of, perhaps, miles of vulnerable, slowly moving, animal transport on the North-West Frontier of India, or maybe, a *pavé* road of the Western Front congested with lorry columns of equidistantly spaced vehicles. But here will be, instead, a loosely and swiftly-moving traffic, covering but a section of its long route, and bearing tonnages considerably less than those of the daily "lift" to the man-powered division of the Great War, and presenting a correspondingly poor target to the air raider. It may move once in every three days, or even less often, and it will carry a replenishment for its formation of a further agreed upon self-containment period. The mobility of the fighting vehicle is such, and the power of dispersing its units by a formation so great, that invasion of a hostile territory is possible, if not preferable, by many routes. In fact, the more the better, for thus the problem of subsisting on the natural resources of the country will be less acute. The former necessity for saving fatigue to marching men by the avoidance of long or round-about routes will not arise: the direct route will not be the obvious one. To-day, moreover, wireless gives a commander the necessary control over his far-flung units; while the friendly aeroplane makes an admirable watchdog of their movement. By means like these will be possible, not only a return to the Napoleonic methods of dispersing divisions for strategical movement and subsistence, followed by, when necessary, their later concentration for battle; but also, a thinning out of the ground objectives for the hostile aeroplane, and greater facilities for their concealment from above.

MOBILE BASES

From where will these convoys jump off? The aeroplane's threat to-day makes the fixed railhead an impossible conception, and a fixed advance base the figment of a dug-out's dream. Yet, as the distance between base and force becomes too great for adequate maintenance, some form of *point d'appui* behind the formation is necessary. The I.C. engine can again come to the soldier's aid. In our army there exist a variety of mobile administrative units—in fact, all forward administration is now on wheels—corps field parks, army field workshops, field

ambulances, and the like, ready and able to form the nucleus and substance of the forward mobile base for a formation. This could be defended easily, planted where necessary, and moved at will. Several such small mobile bases, even though sited in forward areas, would minimize the aeroplane's threat to administration. On each main supply route one such small mobile base would "service" the formation or formations advancing by that route; and it may be visualized as an administrative area, chosen for reasons of strategy and on account of the natural facilities for concealment available, and relying for its immediate defence on its administrative personnel and on the reinforcement reserves, it would normally hold. It would carry the lightest of stocks for the maintenance of the formations it serves—no more, say, than a week's supply at the outside; and, with the exception of an emergency reserve of about two days' supply, the principle to be aimed at would be the lightest of floating stocks, compatible with the tactical situation, and a quick "turn-over"—the principle of the large modern departmental store. In it, above all things—and preferably limited to these, if a very high mobility is in demand—should lie stocks of motivity stores: those which assure the continued movement of the vehicle, such as petrol, lubricants, and spare parts. Other lesser necessities, such as reserves of ammunition, armament spares, and rations, might also advantageously be carried, but in lesser proportion. Here also would be located the percentage reinforcements of fighting vehicles and personnel. It would form the first and forward base for supply; it would constitute a land-dockyard for the repair and overhaul of vehicle-casualties, and would furnish facilities for the temporary care of the wounded; and lastly, it would serve as a *point d'appui* in an immediate sense for its formation, should the latter suffer disaster and have to fall back.

The presence of an advanced mobile formation base would mean that the formation, while exercising the principle of self-containment, would not be overburdened with an accompanying transport so large and unwieldy that it needed an undue proportion of the formation's effectives for its protection. It would be the habitat for a proportion of the transport which at present plies up and down the supply route, congesting it, between railhead and force; and within it would be gathered the bulk of the emergency reserves of petrol and ammunition, borne in divisional petrol and ammunition companies, which to-day form an integral part of a division, and on which, during periods of rest or tactical inactivity, there is little call. Such valuable and dangerous supplies might well be better in the static security of a mobile base, awaiting a demand 50 or even 100 miles in rear—a long distance seemingly, but little when viewed in terms of motor car travel. The

mobile base could also, though its primary function must be the maintenance of mobility, act as a transit area, like the railhead of to-day, for other and less essential general stores, demanded during periods of inactivity. As mobile operations gave place to static warfare the base would move forward, if needed, to exercise a more intimate liaison with its force; and then, doubtless, administrative movement would gradually assume somewhat of the form it took in the Great War. In the planning, however, of any administrative organization, it must be wisdom to plan rather for the greatest demands which might be made on mobility and elasticity, than on anything less; for it is clearly easier in an emergency to slow down, rather than speed up, an administrative process or organization.

Up to the present—so far as the writer is aware—no independent operation of distance other than a raid, and certainly no sustained operation, has been deemed to be within the scope of a mechanized formation. Any idea of progressive conquest—the normal work of the non-mechanized formation—has been held to be outside the realm of practical politics. Exploitation of the mechanized formation's power of self-containment coupled with the presence of such a mobile base would remove these present and stultifying disabilities, and would increase its scope and usefulness. The obvious criticism to the proposal for such a base, and so useful a pivot for administrative movement, would be that it is very much "in the air," far away, and obliged to rely on its own defensive measures in the midst of a hostile territory. The critic, however, still thinks in terms of march distances, forgetting that to-day 60 miles is but a matter of two or three hours' travel at most. He forgets also that it is the widespread manoeuvre, speed and power of its mechanized formation that in the main would constitute its guard and guarantee its safety. Its own defences of fire, trench, wire and land-mine are only its secondary protection; and these would normally only be subjected to attack by small weak raiding forces, which managed to pass through the meshes of its own screening, mechanized forces. An apposite analogy exists in the isolated naval base or port, which, although heavily fortified, relies mainly for its continued security on the power of a fleet in being, which commands the adjacent seas and is based on it.

MODERN DEFENCE AND THE I.C. ENGINE

The strength of a defended position will depend on the time available before attack is expected to materialize. The speed of the approach march is often likely to be a limiting factor to the amount of opposition likely to be encountered by the mechanized force—the capacity for

surprising his foe is but one of the many benefits conferred on the soldier by his adoption of the I.C. engine. Even the heavily and permanently fortified position may fall to a swift, stealthy, and unexpected advance, carried out under cover of darkness. The position to be overcome may thus be found to be one hastily organized and relying for its strength on the natural features of the ground and on the fire power of its units; or it may be the work of weeks of careful preparation, fortified in depth with every known device of modern warfare—wire, concrete, pill-boxes, trenches, dug-outs and land-mines.

A defensive position may be overcome by being :—

- (a) Turned ;
- (b) Enveloped ; or
- (c) Pierced frontally.

In the first of these methods attack, or its threat, is carried out from a flank, and is directed against the flank of the position or its line of communications. The movement may, and generally does, involve certain difficulties inherent in the operation: long distances have to be traversed; the force detached is to a certain extent "in the air" and must rely on itself; it suffers the risk of having its own line of communications cut, and so becoming isolated from its parent force. It is an operation calling for, in a high degree, the qualities of mobility and self-reliance in supply. The Napoleonic division was particularly adapted to this type of strategical movement, owing to its mobility and its practice of self-containment, supplemented by forcible requisition from local resources, it could dispense with any form of continuous supply from the rear. The Roman legion, famous for its marching prowess, possessed the same qualities and, in consequence, a wide range of independent manœuvre. Before the advent of the I.C. engine the possibility of a modern man-power force carrying out a long-distance flanking movement, as a detached operation, had become too hazardous—even if the lack of mobility did not forbid it—on account of its absolute and daily dependence on the flow of continuous supply and administrative movement, from the rear. With the arrival of the I.C. engine, however, the mobile independent manœuvre of an earlier age again becomes a possibility. The mechanized formation's great mobility, high fire power, large carrying capacity, and relatively small personnel, all point to the carrying out of tasks like this. Should the distance to be travelled become too great for adequate maintenance in technical supplies, a small mobile administrative base can be pushed forward to act as an administrative link and a *point d'appui*. Conceive an adequately sustained operation of this sort brought to a successful conclusion—the I.C. engine presents such immense possibilities to a

bold commander—and the likely fruits of it ! The I.C. engine endows the operation with a quality of sustained power never known in the transient operations of the long-distance cavalry raid of the past.

The envelopment of a defended position is, geometrically and in principle, a combination of the other two methods—the flanking and the frontal attack. A primitive example of it is the traditional battle-advance of the Zulu impi, which took the form of a crescent with the two horns advancing more swiftly than the central body. It has been a form of attack particularly suited to, and favoured by, the modern heavy man-power army. Perhaps the greatest modern example was the attempted envelopment and rolling-up against the Swiss border of the French armies by the German masses of invasion in 1914—the gigantic wheel, of which the right passed through Belgium, pivoting on its left in the far South. In this type of operation the main line of communications remains protected by the wide advancing front, thus permitting, with little fear of interruption, the continuous maintenance from the rear so necessary to the sustained action of the force and of its distant wings. The introduction of the I.C. engine into such an operation would mean a considerably added speed to the forces of envelopment. What might not have been the effects of the presence of two or three mechanized formations, buttressed by mobile bases, on Von Kluck's right wing in 1914, in place of marching divisions, hard driven and poorly provisioned ?

Before the attack on a fortified position, a force must be concentrated ; and, in being so, it will offer favourable objectives to hostile aircraft. A mechanized force, however, through the mobility, power, and self-containment possessed by its units, may disperse and quickly concentrate, where desired, for battle at the last moment. The frontal attack on a strongly fortified position is the last resource of generalship. In the Great War the defence dominated the attack ; and particularly on the Western Front, where it was a business of frontal attacks for four years. There the machine gun, coupled with the trench, invariably drove the attack to earth ; and stalemate ensued, until the armoured vehicle eventually restored movement on the battle-field. Since 1918 the unit's fire power has still further increased, till to-day there seems little likelihood that unarmoured infantry will, even at the cost of huge losses, ever be able to arrive on an enemy position which has been systematically fortified. Only armour and the I.C. engine will force a way there, quickly and without unduly heavy casualties, and win what following infantry may later consolidate and hold. Parallel with this growth in the numbers and fire power of small arms has also come an increase in the power and variety of the gun ; until the armoured

vehicle itself is no longer so relatively immune in battle. It must face, besides the more efficient field gun, others specifically designed for its destruction; and tank rifle and anti-tank gun have gone far to remove the unarmoured unit's one-time tank complex. What is the I.C. engine's retort to this? More armour! or more speed!—which is armour.

The embodied alternatives are:—

- (a) Light tanks, small, swift, cheap, and quick to replace; trusting to their speed, inconspicuousness and numbers, that sufficient will succeed in arriving on the position.
- (b) Large tanks, heavily armoured and powerful; relying on their immunity from the fire of the lesser calibres of gun to achieve progress.
- (c) A combination of these.

The former gap between hand-gun and cannon is dwindling fast; and the I.C. engine and its armoured vehicle have brought this to pass. Every increase in automatics and in weight of fire must accentuate the call for more armoured vehicles in proportion to unarmoured infantry—more “mechanization” and less “motorization.” Warfare must increasingly revolve round the duel between gun and armour, between tank and anti-tank. If it be conceded, then, that armourless troops cannot advance in the face of modern fire, this must be left to the A.F.V. What is the likeliest method of its employment? At present, opinion, still swayed by the tank's role in the Great War, is divided on a problem which must eventually be, if not so already, non-existent—whether the light or the heavy tank is more suited to “put the infantry on the position.”¹ Yet surely the real problem should be: What form the tank attack, released from the past trammels of an accompanying infantry, slow moving and highly vulnerable, will assume? And whether the first onslaught should consist of light or heavy tanks, or a combination of these? If we turn to the much greater sphere of naval warfare we see naval formations composed of units of varying mobility, size, power and function—battleships, cruisers, and destroyers—all co-operating. We might accordingly expect to see the last few thousand yards of the attack traversed at speed by swarms of light tanks, moving under the cover of smoke, backed by the heavier metal of the larger tanks and supported by the fire of their mechanized artillery. Let us assume success and face the vexed problem: the A.F.V. may take, but cannot hold, a position; so how is the dangerous interim to be dealt with while the supporting infantry advance to consolidate the conquered position?

¹ The “cliché” confesses their inability to arrive there of themselves.

Too often it is assumed that this supporting infantry must walk—it did so in the Great War. The traditional attitude is reflected in the "infantry" tank. Its proposed introduction, as a means of putting walking infantry on to a position, is a retrograde step in the progress of mechanization. Through the practise of such a precept all the speed and efficiency of a first-class military machine is scaled down to the out-of-date standards of a man's strength and the pace of his marching feet. Should not rather the infantryman be given a form of transportation which will raise his standard to that of the tank? And should his tactical methods in the attack not be revised, if necessary, to conform with the powers with which the I.C. engine can now endow him? The infantry regiment is blessed with a First Line M.T. vehicle, inconspicuous, fast, and strong; and if the carriage forward of lorry-borne infantry be impossible, might this not, when occasion warrants, be effected by the use of vehicles of this type. Only by means of the I.C. engine will the dangerous time-gap between the successful tank attack and the arrival of the infantry of occupation be adequately bridged. The necessity for fast movement before the power of the defence has been completely liquidated may even lead to the necessity for light armour on the transporting vehicles.

In the Great War the problem of maintaining the momentum of the attack, once the crust of the defence had been pierced, was never solved. The soldier is so weak a carrier, his necessities so many, and his war burdens so heavy, that he must relegate his supplies to following transport; and these were never able to move forward fast enough to support and strengthen their hard-pressed consignees. To-day, however, the new super-soldier—tank, armoured car, or other I.C. engined vehicle—has a high power of self-containment, and need not immediately depend on supply from the rear. Through this great quality, provided design exploits it—and this seems advisable, even at the cost of some speed and armour—the continued momentum of the attack may once again be assured: the assault will carry up with it, and in its units, everything it needs. By a more universal employment of the I.C. engine on the field of battle the attack on a fortified position may culminate in operations of mobility, instead of in the stagnation of static warfare.

CONCLUSION

The assistance which the I.C. engine can give in countering the air menace and in overcoming the strength of modern defence will be governed by the extent to which free play is given to, and the fullest advantage taken of, the two great qualities inherent in the I.C. engined vehicle—its mobility and its capacity for self-containment. Improve-

ment in the first of these may safely be left in the hands of civil industry ; exploitation of the second must be a matter for studied design and experiment by army authorities. The respective solutions for the two parts of our problem here put forward are founded on the above qualities, and may be briefly summed up. They are : firstly, a clean sweep of the existing lay-out of administrative movement, which has outlived its usefulness, and the substitution for it of self-containment in the formation as far as possible, coupled with a long-distance convoy system based on a small mobile administrative base ; and secondly, the surrender by the infantry of its traditional role of storm troops and its relegation to the province of defensive action, together with a much greater exploitation of the fighting vehicle for all offensive purposes. The character of war must depend on that of the basic unit around which forces are built up. In land operations to-day is the basic unit to be the fighting vehicle, complete with all its constituents, or the man ? All hinges on that. Should military opinion concede the first, then the lay-out of battle, and particularly that of its administrative movement, must be planned anew.

MEETING OF REGIMENTAL REPRESENTATIVES ON THE UNIFORMS, EQUIPMENT, STANDARDS AND COLOURS COMMITTEE

On Friday, 15th October, 1937, at 3.30 p.m.

GENERAL SIR ROBERT WHIGHAM, G.C.B., K.C.M.G., D.S.O., in the Chair.

THE CHAIRMAN'S ADDRESS

I AM very glad to see such a good response to our invitation.

I think I had better begin by explaining to you the object of this meeting. It is to put before you, perhaps more fully and more easily than could be done by correspondence, exactly what we are aiming at in compiling a Summary of Information about the old uniforms, equipment, colours and standards of the British Army, and to tell you how far we have progressed in that project. We also desired to create an opportunity for others who are experts in or interested in this subject, to meet here, where for over a hundred years it has formed an important part of the work of this Institution.

The origin of this new development was a lecture given by the late Major H. F. Stacke in this theatre just four years ago, in which he suggested that something in the nature of this Summary ought to be compiled. The Council of the Institution took the matter up, and, after consultation with the Society for Army Historical Research, a letter was addressed to all Colonels of Regiments asking if their units would co-operate and if they would nominate a Representative. The response, I am glad to say, was very encouraging; every regiment and corps in the Army, with very few exceptions, desired to be represented, and all their Regimental Representatives are now Associate Members of the Committee, which includes representatives of the War Office, the Society for Army Historical Research, the Victoria and Albert Museum, the National Portrait Gallery, the London Museum, and, of course, our own Institution, as well as other experts on the subject.

The first difficulty we encountered was that the information which we wanted to summarize was very widely dispersed: a great deal of it is to be found in books, such as Regimental Histories and biographies, which are in the Library of this Institution, and in other publications there, in the Prince Consort's Library at Aldershot, and in numerous

other libraries, including private ones. The British Museum, and particularly the Public Records Office, are other sources of information. But many details can only be discovered by searching through old Army Orders, old *London Gazettes*, Regimental Records, and back numbers of Service periodicals.

With regard to paintings and engravings, some of the most interesting and some of the most valuable from our point of view are in St. James' Palace, Windsor Castle, or in private ownership. Many of the experts to whom I have already referred have their own sketches or can say where you will find other pictures.

It is not intended that this Summary of Information shall become an encyclopædia; that would be too much to expect, if for no other reason than that the whole building would not be able to contain all the volumes. What we are aiming at is a compilation which will register in convenient form exactly where all these details of military dress, etc., can be found. That may sound rather a limited object, but it is just here that we hope the Regimental Representatives will come in. You, we hope, will be able to build up for your own respective regiments much more elaborate records than we could compile here for the whole Army.

One thing which encouraged us to ask you to come here as our Associates was the growth of interest in Regimental Museums. But here—I say it with all respect and I am speaking only from my own personal experience—there is a tendency on the part of some of those Museums to collect a great deal of material that is of no great value from the collector's point of view, although some of it may be of interest from the regimental and sentimental point of view. Personally, I go through my own Regimental Museum periodically and cast out what is really "junk." I think that ought to be done, and that those Museums who do it have a higher standard of exhibits in consequence.

Mr. J. L. Nevinson of the Victoria and Albert Museum, who is present to-day, has very kindly said that if any of you are interested in the technique of preserving old uniforms, he might be able to help, because his Museum makes rather a speciality of the process.

You may ask what good is all this going to be. For one thing, historically and artistically, it is very valuable indeed. Every regiment takes an interest and pride in its own uniforms, and I believe that the Powers-that-be are considering reintroducing a walking out and ceremonial dress. Why should not we incorporate in that dress some of the features of the old traditional dress of the different regiments? I do not think that need cost any more money, and in a walking out dress I do not see why there should not be room for a little embellishment

which would help to preserve regimental traditions. Then there are tattoos and pageants ; some are dressed by great experts, but many of the smaller affairs do not have the advantage of expert advice and their organizers may be glad to have a convenient source of information to which they can refer, so as to be sure of getting details accurate. It may also be useful to the makers of films : many historical films show a deplorable lack of accuracy in regard to the uniforms of the period.

The best way to carry out this work is to tackle it from both ends. The Royal United Service Institution is marshalling all the very considerable information it has already got and using the special opportunities it has for getting more ; it will act as a co-ordinating authority. But we hope that you, from your end, will go into the matter in as much detail as you can. I would suggest that you should start from the beginning of your regimental history, dealing with the various periods in which uniforms of a certain type appear to have been in vogue, and then follow that up, tracing each successive type until you have built up the whole history. If you search your regimental records, pictures, histories, and so on, you will possibly find authority for those changes, and so you will be able to make a very complete story. But there are two points that I should like to emphasize. One is that you should get the details in chronological order, and the other is that you should be very careful about accuracy, particularly with regard to pictures. Some artists were meticulous in regard to details of uniform, but others were not. In quoting a picture, give the name of the artist, with the date if possible. In the case of engravings, give the name of the artist, the name of the engraver, the name of the publisher, and the date of publication.

It might interest you to see a little index which Mr. Nevinson has drawn up of the collection of Mr. S. W. Reynolds which is in the Victoria and Albert Museum ; copies of the index are available here, and it is an example of how information can be put in a convenient form and yet with all the necessary detail and authority that it must have if it is to be of value.

As regards the Summary : we are having a volume compiled for each regiment. Captain Anderson, who has been doing this work, will show you how it is progressing. Needless to say, the volumes that contain most are those which refer to the regiments which have sent in the fullest reports. Some of those reports are very good indeed, and we look forward to receiving others of equal value in the near future. There is a good deal of spade work to be done, and I know that much of it is not easy ; but I am sure that the regiments themselves will find it very interesting, and that our successors will bless us for having taken on this task.

We do not want to confine ourselves to the remote past. It is now nearly twenty years since the Great War ended : think of the enormous variety of dress which the British Army wore between 1914 and 1919 ; think of all the theatres in which it fought, each necessitating a special type of dress. The time will come when information about those different types and the reasons for their introduction will be historically most interesting and also technically very valuable.

With regard to Colours : before we started this Committee on old uniforms, the Institution had already started to compile a Census of Colours, and many regiments have already sent in information about their Colours or Standards. The object was to find out where all the old Colours of regiments were and it is extraordinary how they have been unearthed. Many of those of which all trace had been lost by their regiment have already been discovered through this Census in churches or private houses. In the case of my own regiment, we have found two sets of Colours which we did not know existed.

Cards have been prepared, and can be supplied on application to the Librarian of the Institution, showing the essential headings under which information should be filled in, and I hope if any of you have not yet had them you will ask for them to-day.

Colonel Savage, who is here to-day, has had a good deal of experience of this subject and has taken a lot of trouble to ferret out the details about the Colours of his own regiment. I think if he tells you what he has done it may save many of you trouble when you are doing similar work for your regiments.

Those, then, are the outlines of the scheme. I hope I have said enough to inspire you with the desire to make it a success. You will, I am sure, appreciate that that can only come about through the cordial co-operation of everyone associated with and interested in it. We are doing our share, and I hope that you and as many friends as you can enlist will help.

LIEUT.-COLONEL M. B. SAVAGE gave details of sources of information about Colours which he had found valuable in the course of his researches.

These are summarized on pp. 752-4 of this JOURNAL.

Colonel Savage also said that he had received much assistance from the War Office Library.

The REV. P. SUMNER, referring to certain British Colours which were captured by the French Armies under Louis XIV and Louis XV, and which are now in the *Musée d'Armée, Les Invalides*, Paris, said that illustrations of practically all of these were in the Royal Library at Windsor Castle. They were most interesting, and ranged from the

Colours of the Buffs captured in 1693 to certain Colours captured at Fontenoy.

CAPTAIN J. S. HICKS, R.M. : Is there any intention of extending this project to the Navy ?

The Secretary—CAPTAIN E. ALTHAM, R.N. : The question of naval uniforms has been left in abeyance, at any rate for the present, because it is desirable that we should concentrate our resources on dealing with military uniforms, which are a far more extensive study, requiring a much wider range of research. Information about naval uniforms is much more easily obtained. We have got a very great deal here, and we keep in very close touch with the other two principal authorities—the Admiralty Library and the National Maritime Museum.

We have in our Museum the original official patterns of the first recognized naval uniforms, approved in 1748. Prior to then, the dress of naval officers was largely a matter of custom and personal taste.

CAPTAIN DONALD ANDERSON, in describing the system on which he is compiling the Summary, said that he was endeavouring to produce a volume for each regiment similar to those which he had there for inspection. Each page was divided into four columns, giving the date, the subject-matter, the location, and, where applicable, the catalogue number ; for instance : " 1760. Officer's Sword, Third Foot. R.U.S.I. 7067."

In a typical volume, that of the Buffs, he had made 333 separate entries already, and there would probably be one or two thousand eventually. The work had definitely begun, but only begun. As soon as he had completed a book as far as possible, it was sent to the Regimental Representative, who corrected any mistakes and made his own comments and additions before returning it. By this system of shuttle-cocking the books between the Institution and the Regimental Representatives, it was hoped that they would become complete and accurate. He had done eight volumes already ; in addition he had made out a dossier for every unit of the Army into which he put material which would eventually go into their respective books.

The sources he had drawn on for information were as follows. First of all the experts on the Uniforms Committee had helped greatly by giving him data, and there were other experts who had also assisted. Then many Regimental Representatives had already sent in information. Finally, there was all the wealth of material in the Institution, including the exhibits in the Museum, the pictures and prints. Most of the pictures and prints he had already dealt with, and the same applied to the Museum ; that work would soon be finished. Then there was the

Institution's Library which he had not nearly completed. There were many volumes of prints and coloured plates, Regimental Histories and, more particularly, the Journals of the Society for Army Historical Research ; all the necessary references to those authorities had eventually to go into the Summary. In fact, he had only scratched the surface so far, but he would go on digging.

CAPTAIN H. OAKES-JONES, said he would like to offer a few words of advice to the Regimental Representatives. In some cases it might be difficult to collect material because those who were most keenly interested might have either left the regiment or gone abroad, and the younger officers who had taken their place had not the same knowledge of regimental traditions. In any event, he would remind those who were doing the work to remember that from 1800 the pattern of officers' uniforms was known, so they need not trouble about such things as the cut of tunics, etc., subsequent to that date. But it would be most helpful to have photographs and an accurate description of such details as buttons and badges, because those were the things of which they had not got official records and which were very often evolved by some accoutrement maker without any real reason, and there was no authority for them.

If they were in doubt, he suggested they should consult the Army Historical Research Society, who would be able to date and identify things from photographs if originals could not be sent.

MAJOR-GENERAL SIR HENRY EVERETT said that he thought the Meeting had been very useful and that there ought to be one of the same kind at least once a year, so that they could exchange information.

THE CHAIRMAN cordially agreed, and said that he proposed to make the Meeting an annual one.

On the motion of CAPTAIN THE MARQUESS OF CAMBRIDGE, a vote of thanks was accorded to the Chairman, and the Meeting then terminated.

STANDARDS AND COLOURS

The following information has been compiled by Lieut.-Colonel M. B. Savage, C.B.E., D.S.O., late South Staffordshire Regiment.

A BIBLIOGRAPHY OF REFERENCE BOOKS

Standards and Colours of the British Army, 1661-1881, by Milne.¹

An excellent work, well illustrated. It is the best book on Colours. Publication was limited, and it is not easy to procure. Present price is about fifty shillings.

¹ Copies of this book are in the R.U.S.I. Library.

There is a copy in the Institution's Library, also in the British Museum.

Old Scottish Regimental Colours, by Andrew Ross, dated 1885.¹

Flags of our Fighting Army, by Stanley C. Johnson.¹

Quite a useful little book for the beginner. It is out of print, but a second-hand copy can be obtained for about six shillings.

Colours of the British Army, by R. F. McNair.¹

This book mostly deals with the Colours of the Guards.

Colours and Guidons.¹

This contains pictures, photographs, and drawings of many Colours.

Military and Maritime Discipline, by Venn.¹

On page 175 *et seq.* are some interesting notes on the early history of Colours.

The Journal of Army Historical Research Society.¹

This Journal has published much information on Colours, Standards, etc. The index should be consulted. In the Spring Number of 1935, No. 55, page 48, will be found some very useful and interesting "Notes on dimensions and designs of Regimental Colours," by the late Lieut.-Colonel P. R. Phipps of the Dorsetshire Regiment.

OTHER SOURCES OF INFORMATION

• COLLEGE OF ARMS, Queen Victoria Street, E.C.

In 1806, York Herald, Mr. G. Naylor, was appointed Inspector of Regimental Colours. He laid down a standard pattern for both Colours and sent drawings to Units to fill in the centre of their individual Colours.

In 1820 a Vellum Book was introduced by the Inspector containing coloured paintings of every officially approved Colour, each signed by the Sovereign. This book is kept up by the Heralds' College as a permanent record.

Garter King of Arms, Sir Gerald Wollaston, is now Inspector of Regimental Colours, and any unit requiring paintings of their Colours since that date can obtain them on payment.

¹ Copies of these books are in the R.U.S.I. Library.

THE ROYAL LIBRARY, Windsor.

In the Royal Library, Windsor, can be found drawings and paintings of Regimental Colours of the 1743 period and also others of an earlier date. The dimensions of the early colours are given.

Access to the Library can be obtained by writing to the Librarian stating for what purpose it is desired to use the Library.

THE PUBLIC RECORD OFFICE, Chancery Lane, W.C.

In the Legal Research Room can be found the *List of War Office Records XXVIII* (72). This contains an index of Inspection Reports and other items of Military interest.

These Reports were half-yearly and were commenced in 1770. General Officers were directed to report at these half-yearly inspections of Regiments on the condition of the Colours, and if they were in strict accordance with the regulations. A special space in the Report was afforded for this information to be recorded.

From these reports the date of issue of different Colours can also be ascertained.

On an application in writing being made to the Secretary, a pass is issued to those who wish to use the office. The War Office has a copy of the index.

VICTORIA AND ALBERT MUSEUM.

The works of Mr. Reynolds can be found in this library. They consist of a large number of volumes, on the uniform, equipment, and colours of regiments. These books also contain a number of paintings, and illustrations.

THE WAR IN THE AIR THE FINAL STAGE

By MAJOR OLIVER STEWART, M.C., A.F.C.

TIME does not seem to bring any clarification of or any general agreement upon the problem of the air bombing of cities. All nations profess to regard the attack of "open" towns with abhorrence, and they state that the objectives should be strictly confined to those with military significance. Yet, in Abyssinia as in China, the two conflicting sides hold opposed views as to what is an open town and what a military objective. The attacked proclaim that civilian centres have been raided and women and children have been mercilessly slaughtered; the attackers state that their objectives were ammunition dumps, armament factories, or railway stations. When such arguments are in progress it is both instructive and salutary to glance back to the years 1914-18 and to recall the reactions of this country when the German bombing raids were at their height.

BOMBING OF OPEN TOWNS

For controversial purposes it is useful, perhaps, to distinguish between retaliatory bombing and reprisals. Mr. H. A. Jones in his final volume of *The War in the Air*¹ makes the point that reprisals are violations of the laws of warfare undertaken in answer to similar violations, whereas retaliatory bombing is undertaken within the laws of warfare. Under the stress of action, however, it is difficult for the people of any nation to pay much attention to such a distinction. Suffice it to say that when the Germans bombed London the demand was for reprisals. The people of this country believed that the laws of warfare had been broken and they asked that our own airmen should also break them in reply. Sir Douglas Haig, writing to the Commander-in-Chief of the French Armies of the North and North-East, called them "reprisals," and there can be no doubt that the big Handley-Page machines which were being built under pledges of secrecy at the end of the War by Harland and Wolff at Belfast, were intended for reprisals, that is for the bombing of Berlin and not specifically for the bombing of military objectives in Berlin.

¹ *The War in the Air* by H. A. Jones, Vol. VI (Oxford Press), 2 volumes, 25/-.

In all, German airships dropped 5,806 bombs on Great Britain, including the Metropolitan Police District and the County of London, in 51 raids; they killed 557 people and injured 1,358. The average weight of bomb was 75 lb., the average casualty per bomb was 0.33, and the average monetary damage per bomb £263. German aeroplanes made 52 raids and dropped 2,772 bombs; they killed 857 and injured 2,058. The average weight of bomb was 59 lb., the average casualty per bomb 1.05 and the average monetary damage per bomb £520. This was not really severe bombing, as can be seen from a comparison with the activity on the British front in France. In the month of May, 1918, alone 896 enemy aeroplanes were reported and 3,720 bombs were dropped. They killed 580 people and wounded 1,353. Yet, although the bombing of Great Britain was relatively so insignificant in volume, it created an emotional state in the country which had important effects upon Allied aerial strategy. The view expressed by the Germans that all British towns behind the naval defences were defended towns, and therefore admissible as military objectives, was scoffed at, and the demand for reprisals became so loud and so insistent that it led eventually to the formation of the Independent Air Force under Major-General Trenchard, as he then was. It is a consolation, no doubt, to refer to the bombing done by the Independent Air Force as "retaliatory," but examination of the results shows, unfortunately, that it differed not at all so far as its effects are concerned, from the German bombing of London. In his memorandum to the Prime Minister—Mr. Lloyd George, in January, 1918, Major-General Trenchard stated that it was intended to attack with as large a force as was available the big industrial centres on the Rhine and in its vicinity. It was also intended to attack steel works near Briey and Saarbrücken and submarine docks at Bruges and Zeebrugge. The long-distance work was based on Nancy. Let us glance at some of the results.

Mr. Jones shows that, according to the official German figures, a total of 229 attacks on German territory was made by British and French machines by day and 446 by night, and that the estimated number of bombs dropped was 14,208. The total German casualties, civilian and military, were 746 killed and 1,843 injured, and the damage was estimated at 24 million marks—say, £1,200,000. In one attack by twin-engined aeroplanes, each carrying one 1,650 lb. bomb, Wiesbaden was hit, although the objectives were the Badische works at Mannheim and the Krupp works at Essen; one pilot was prevented by bad visibility from reaching his objective and dropped his bomb on an unidentified but fairly well lighted town on the Rhine. This turned out to be Wiesbaden. The damage was heavy; the fire brigade had to call in military assistance, and the rescue work continued for three days.

Twelve bodies were recovered from the debris of the houses, and thirty-six people were treated for severe injuries. Cologne, which had been bombed by a naval pilot in 1914, was subjected to its next day attack on the 18th May, 1918, when six machines of No. 55 Squadron went over from Tantonville, leaving at 6.35 a.m. and arriving at Cologne two and a half hours later. The town was bombed from 14,500 ft., with railways and factories as the objectives. It was a surprise attack, because the observation service had broken down, with the result that the inhabitants received no sort of air-raid warning. About forty people were killed and about one hundred injured. "There were," writes Mr. Jones, "reactions to this raid similar to those which had followed the more important German attacks on England. Questions were asked in the Reichstag and anxiety spread to all the Rhineland towns. It is significant, also, that after this first daylight attack in force on Cologne, it was urged in many responsible quarters in Germany that steps should be taken by the German Government to agree with the Allies to abandon or limit bombing attacks from the air." In the British raids, although military objectives were ordered, civilians were killed, including women and children, and churches and hospitals were hit. It was not, of course, the result of deliberation on the part of the pilots, but of the exigencies of war which lead to gross inaccuracy of bombing, and to pilots losing their way and mistaking their objectives.

The general impression one must reach if one seeks to co-relate the experiences of the war of 1914 with the events which are happening in the world to-day, is that the bombing of open towns, whether it is placed in the category of reprisal or of retaliation, is a form of attack which few countries engaged in a major conflict would fail to make use of at some time or another. To criticize such action at a time when the country is at peace, or at any rate when its existence is not threatened, is one thing; to resist it when the country, in a state of semi-exhaustion and violent emotional upheaval, is struggling for its life is another. The bombing of open towns is to be deplored; but it is a contingency for which preparations should be made in all well-founded defence policies.

MAN-POWER FOR PRODUCTION AND SERVICE

Another matter of immediate importance during the present expansion of the Royal Air Force is concerned with the balance of man-power between supply and active service, and upon this, too, the history of the concluding stages of the Great War has much information to give. We see a continuous and gradually more and more intensive competition for men between the armaments factories at home and the fighting line in France. If supply to the troops in the field is to be maintained,

men must be held at home to work in the factories. Yet the troops in the field are urgently in need of men. There is a clash of opinion as to how many are needed in one place and how many in the other. As one studies the official history, it becomes obvious that the correct balance of man-power had much to do with victory or defeat and that its achievement was a problem of such complexity that one marvels that a correct solution was found by the seemingly haphazard methods which then prevailed. Computation on the supply side, which determines the numbers of men to be kept in the factories, has to take into account both reserves and replacements of aircraft. An analysis of some of the statistics of aircraft wastage during the War shows that in order to start a new squadron 100 per cent. of aircraft, complete with engines, additional to the establishment must be provided in the first place. Thus a squadron of eighteen aeroplanes, which was the normal strength at the time, required six extra machines to cover wastage during mobilization and transit to France, six to go overseas as Expeditionary Force reserve at the same time as the squadron, and six more for allotment to training units to enable the flow of pilots to the squadron to be maintained. Subsequently, in order to replace wastage and to build up a reserve, nine aeroplanes had to be provided each month. Mr. Jones gives the rates of wastage as 66 per cent. per month for fighter squadrons; 50 per cent. for two-seater fighters; 50 per cent. for Corps squadrons; 33½ per cent. for bombers; 20 per cent. for Home Defence squadrons; 20 per cent. for Middle East Squadrons; and 20 per cent. for Training squadrons.

In July, 1917, Sir William Weir told the Air Board that to maintain a hundred squadrons of eighteen aeroplanes in the field, a production rate of a thousand aeroplanes per month was needed. For home defence and training the rate was about half. Thus 1,500 aeroplanes a month was the production rate called for to maintain 1,800 aeroplanes in the field. French calculations showed that to maintain 4,000 aeroplanes in the field with the necessary reserves a production rate of 2,400 aeroplanes and 4,000 engines per month was required. Now the Royal Air Force first line strength at the present moment has passed the 1,500 mark. It will reach 2,000 in the near future. If a proper balance has been struck between supply and first line strength our factories will have to be in the position to produce new aeroplanes at the rate of more than 1,500 a month. Whether they can do so or not depends on the supply of skilled labour they can command. If we look more closely into this war-time history we shall discover what is the key to this apportioning of man-power between supply and operations: it is the man-hours of production. During the War the man-hours of production for each aeroplane were relatively small. To-day with the enormously

increased complexity of the modern machine, the use of numerous additional aerodynamic and navigational devices and the employment of much higher powers, the man-hours of production have soared. No statistics are available so far as I know to enable a true comparison to be made; but even taking into account the introduction of the latest methods of series production, I should say that the demand on man-power for an equivalent aircraft production rate at the present day would be threefold what it was. The implications are clear: good quality in aircraft is as important now as then; but there must be a point at which it would be correct to select a slightly less efficient aeroplane if it cost less in production man-hours. The overwhelmingly important lessons which this history of the closing stages of the air war has to teach us to-day, is that production man-hours must be constantly borne in mind when new aeroplanes are being ordered and when first-line strength is being computed.

Having thus emphasized the importance of man-hours of production and given the aeroplane designed expressly for large-scale series production its due, I must turn to the other side of the picture and note that, in seeking to reduce the man-hours of production to a minimum, it is only permissible to allow a very slight drop in technical excellence. For if there is, between two warring air forces, much discrepancy between the technical merits of their machines, the air force with the better machines will dominate even though it may be numerically inferior. This happened during the War, when on several occasions the German air service possessed aeroplanes which were technically superior to those in the Royal Flying Corps and the Royal Naval Air Service. Although the Allies were numerically superior to the Germans, the Germans succeeded in holding them at bay, and in doing considerable execution among them solely because of the technical excellence of their material. Indeed, had it not been for the design skill of the French, our own air services would have been in a bad way more than once. The French Nieuport fighter in 1916, and the French Hispano-Suiza engine later on, may be said to have saved the situation. So we have three conflicting requirements which have to be balanced when dealing with the needs of an air force in the field: technical excellence of equipment, man-hours of production, and first-line strength. All who are interested in our present air force expansion programme will find in this final volume of the air history of the War an invaluable source of information on the subject.

The War in the Air welds together the facts and figures of warfare into a coherent, often exciting story. We have in this volume a stirring description of the last fights of the famous Richthofen circus when it

was commanded by Hauptmann Hermann Göring¹: the squadron was fighting desperately, flinging itself into battle with utter disregard for the consequences; some of its pilots were doing as much as ten hours' flying a day, and the losses were appalling; within a short time it was reduced from fifty to eleven aircraft; but its great reputation had been maintained and even enhanced.

NAVAL AIR WORK

After the activities on the Western Front have been dealt with, the creation of the Royal Air Force described and the problems of supply and man-power set out, Mr. Jones turns to the operations of the Independent Air Force, operations which have already been discussed. From there he goes to the air operations in Palestine in 1918. General Allenby and Colonel T. E. Lawrence appear, and in the next chapter we are brought to the Mediterranean in 1918, and subsequently to naval air developments and operations in 1918 in home waters. Kite balloons were used increasingly in the Mediterranean in 1918 for securing protection against U-boats; but they were not without their critics, and in home waters in the same year the aeroplane took on a new importance as an anti-submarine weapon. At the end of January, 1918, the Commander-in-Chief of the Grand Fleet asked for additional aircraft to patrol the coastal area between the Tyne and the Tees, where U-boat operations were intense. Then the scheme of "protected lanes" for merchant vessels was put forward and the Air Ministry offered to provide the Admiralty with aeroplanes organized as thirty-two flights for this work. "As a body," writes Mr. Jones, speaking of these flights, "they were the Cinderella of the air service. Many of the flying personnel suffered physical disabilities, some the result of service overseas. The repair facilities were never adequate, and the flights were at no time up to strength in pilots, observers or mechanics, so that the personnel were always overworked. For most of the time during which the flights operated no armourers were available, nor any efficient bomb sights, and the bombs themselves were stored, more often than not, under tarpaulins in open fields, with the result that many failed to explode when dropped. . . . In spite, however, of the unsatisfactory conditions under which the flights worked, on the ground and in the air, they played their somewhat lonely and monotonous part with a will which more than once earned the admiration of the naval authorities."

The Admiralty statement of April, 1918, is given, setting out the Admiralty requirements for the employment of aircraft in the U-boat campaign. In the Volume of Appendices is given a comparison of anti-submarine flying operations between Groups Number 9, 10 and 18,

¹ Now General Göring, Chief of the German Air Force.

at Plymouth, Portsmouth and the East Coast, from the 1st July, 1918, to the 30th September, 1918. The table shows exceptionally short average lengths of flight, yet a fairly low figure for the hours of flight per enemy submarine sighted. The average flight times for the seaplanes are mostly between one and two hours. The hours of flight per enemy submarine sighted for the same type of aircraft range from 642 to 100. Some of the accounts of the actual operations against submarines serve to indicate the difficulties of the work. On the 30th May, 1918, the s.s. "Dungeness," while in a convoy off Sunderland, was torpedoed by a submarine, which was not identified. The U-boat was seen from a D.H.6 aeroplane which bombed her, and she was afterwards attacked with depth-charges from surface craft. About three hours later the submarine was sighted awash off Seaham by a Sopwith "Baby" seaplane which dropped a bomb close to her conning tower as she was going under. Light signals from the seaplane brought a destroyer and a Blackburn "Kangaroo" aeroplane to the scene, but the U-boat had disappeared and she was not found again until the following night, when about 9.15 p.m. she was seen moving under the water near Seaham, from an F.E.2b aeroplane which had been sent out from the Seaton Carew air station to take part in a special hunt. The pilot dived, and two 100 lb. bombs were dropped astride the blurred outline of the U-boat. The explosion of the bombs attracted the destroyer "Locust," one of the hunting craft, which raced to the spot and dropped a depth charge. When the water thrown up by the explosion had subsided, the aeroplane observer could still detect the outline of the submarine beneath the surface, and he was able to indicate, by hand signals, where additional depth charges should be dropped. After the fourth had exploded, the conning tower and side of the submarine suddenly broke surface, and she turned slowly over before sinking; it is possible that she had suffered some damage during the attacks on the previous evening.

Zeppelin hunting is another activity in which there was co-operation between aircraft and surface vessels, and the successful use of a towed lighter for launching a Sopwith "Camel" fighting aeroplane is described. In one attack Lieutenant S. D. Culley flew the "Camel" off the lighter and attacked the Zeppelin "L-53" at 19,000 ft. head on. A burst of flame in the sky showed watching eyes in the ships that his mission had been successful, but, although smoke screens were put out to guide him back, he did not return, and it was not until two hours later that he was picked up with his aeroplane. "I consider," reported Rear-Admiral Tyrwhitt, "that Lieutenant Culley's success is second to none of the many glorious deeds of the Royal Air Force, and an example of pluck, endurance, and great personal courage."

THE OFFENSIVE POLICY

The volume concludes with a description of the final stages of the War from the battle of the Aisne and the second battle of the Marne to the Amiens offensive, the battle of Bapaume and, finally, the resumption of the offensive in Flanders on the 14th October. Mr. Jones devotes a few remaining pages to commenting upon the offensive policy adopted by the British flying services. This policy has been vigorously criticized as being wasteful of life and material and ineffective from the military point of view. This historian, however, approves of the policy, saying that it suited the temperament of the young pilots of the time and that it kept the Germans at bay. But he admits that "offensive patrols were too much a matter of routine." It is questionable whether he has fully grasped the grounds of the criticism directed against that policy. They are not so much that it was offensive, as that it was continuous. It has not been suggested that passive defence is practicable in the air; but that the offensive must be organized with imagination and cunning and must not be turned into a beef-and-blood offensive in which the sole guiding idea is that of pouring machines over the lines regardless of casualties. So far as I know there are no figures upon which to make a fair comparison between English and German methods; but it seems established that, to gain the ascendancy, the British air service had to enjoy an enormous numerical preponderance. Even then its losses were heavy. There is good reason for believing that neither the enormous numerical preponderance nor the heavy losses were essential to the establishment of air superiority.

However, that is an arguable point. For the rest this final volume of *The War in the Air*, like its predecessors, is a model of what such things should be.

THE ORIGIN OF POPULAR INTEREST IN THE ROYAL NAVY¹

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POPULAR interest in the Royal Navy to-day is taken as a matter of course, most Englishmen assuming it to have been existent since Nelson's day at least; yet the truth of the matter is that it is little more than two generations old. Captain Sir Seymour Fortescue wrote of the Eighties that, outside of the great government naval ports, "the ignorance of the British public of everything regarding the Navy can only be described as colossal."² The vastly increased interest and knowledge of naval affairs by Englishmen was one of the most striking aspects of English history in the Nineties. From the conclusion of the Napoleonic Wars until late in the Century the subject of naval defence was almost foreign to English thought. The magazines and reviews of the time bear scarcely a trace of any movement of opinion on this matter. *The Times* and the journals published at the naval ports were the only non-Service papers which devoted even the smallest amount of space to naval subjects. Everything in regard to the Navy was regarded as recondite, uninteresting, and a matter for experts. The silence of the Press reflected the apathy of the public. Furthermore, the notion of "command-of-the-sea"³ was regarded by Englishmen as their birthright and something which it was impossible to lose. No interest in questions of naval strategy or tactics was betrayed by any but professional men. Naval history was relegated to the dry-as-dust chronicler, and the only naval books that had a market were "blood-and-thunder" stories for boys. In Europe, during the period 1870-90, navies were not held in high repute. The failure of the French navy to accomplish much in 1870, and of the Turks to contest the command of the Black Sea with Russia in 1877, caused sea power to be held in slight estimation in comparison with land power. To have a navy was regarded, as one writer puts it, rather as a sign of substance, like keeping a carriage.

¹ The writer is concerned here mainly with immediate causes (though causes and effects are difficult to separate), not with the basic factors underlying British naval expansion and the popularization of the Navy.

² *Looking Back* (London, New York, etc., 1920), p. 149.

³ The phrase "command of the sea," which was much in vogue before the Great War, is loose and misleading. No nation has ever possessed anything so comprehensive as general command of the sea; what is really implied is "command of sea communications and the power to deny their use to an enemy."—EDITOR.

It was not until the navy scares of 1884 and 1888 that the public began to take an intelligent interest in the British fleet. The Jubilee naval review at Spithead in 1887 had exhibited to the people the weakness as well as the strength of the Navy, and the lessons of the display had been interpreted to them by numerous writers in the Press. In 1891 was held the extraordinarily successful and very instructive Royal Naval Exhibition. Open to the public on 151 days and visited by nearly two and a half million people, the Exhibition did much to arouse a more general interest in the Navy. At the suggestion of Mr. W. Laird Clowes (the Naval Correspondent of *The Times* from 1890-95; and one of the most capable and influential naval writers of the period) the Navy Records Society was founded in 1893 for the printing of documents and papers connected with naval biography, history, and archæology.

In the Eighties, when Lord Charles Beresford was in Parliament, that active officer, in order to interest some of his fellow-members in naval matters, occasionally invited them to accompany him on a visit to Portsmouth Dockyard, a practice he resumed whenever he subsequently held a seat in Parliament.

A most important factor in arousing the English to interest in their Navy, and in particular awakening them to the importance of naval supremacy, was the appearance of Mahan's epoch-making *Sea Power* volumes in 1890 and 1892. These works effected a revolution in the study of naval history "similar in kind to that effected by Copernicus in the domain of astronomy." Historians had treated naval history for the most part as a series of external episodes, subsidiary and subordinate to contemporary military enterprises. Now, Mahan showed almost for the first time what sea power really was and what its influence had been in history. He proved by a wealth of example that sea power was silent and far-reaching in its operation, affecting the national well-being in peace and the national strength for war in many directions. He revealed that the growth and prosperity of nations depended largely on it. His works enabled even laymen to grasp the principles which governed naval warfare.

Mahan's teachings were quickly known and accepted in practically all naval countries, as the *Sea Power* books were translated into Russian, French, Italian, Spanish, German and Japanese.

"The ears of statesmen and publicists were opened, and a new note began to sound in world politics. Regarded as a political pamphlet in the higher sense—for that is how the famous book is best characterized—it has few equals in the sudden and far-reaching effect it produced on political thought and action."¹

¹ Sir Julian Corbett, "The Revival of Naval History," *Contemporary Review*, November, 1917.

But nowhere did Mahan meet with such an immediate and overwhelming success as in England.

"To Great Britain in particular the book came as a timely analysis of the means by which she had grown in wealth and dominion. This was indeed no discovery. Nearly three centuries earlier Francis Bacon had written, 'To be master of the sea is an abridgment (epitome) of monarchy . . . he that commands the sea is at great liberty, and may take as much and as little of the war as he will.' Before and after Bacon, England had acted upon this principle. But it remained for Mahan to give the thesis full expression, to demonstrate it by concrete illustration, and to apply it to modern conditions."¹

The *Sea Power* volumes were reviewed eulogistically in newspapers and periodicals, one review by Professor Laughton, in the *Edinburgh Review* (Oct., 1890), extending to thirty-three pages. British naval authorities and statesmen were unanimous in their high praise. Gladstone, that arch foe of "bloated armaments," pronounced the second *Sea Power* work to be the "book of the age." Indeed, Mahan's volumes became a "bible" to all naval experts. They were quoted everywhere—in public speeches, in parliamentary debates, in writings.

With Mahan's name is linked that of Admiral Colomb. His *Naval Warfare* was published shortly after the appearance of Mahan's first volume, and, although it was never popular nor widely read, its importance cannot be exaggerated. The two books contained the same arguments and lessons, but in a sense they were complementary to each other. While Mahan aptly defined his subject as the "Influence of Sea Power," Colomb gathered facts to show what sea power was, how it acted and how it must be used in order to exercise this influence.² Colomb and Mahan inspired a number of naval treatises, the most influential of these being *Imperial Defence* (1891), by Sir Charles Dilke and the late Spenser Wilkinson, which emphasized the dependence of the British Empire on the strength of its Navy—"To an Empire built upon commerce the loss of the command of the seas means ruin."

Thus by 1893 the English were becoming alive to the importance of their Navy. The agitation of 1893 and succeeding years was to be

¹ Allan Westcott, *Mahan on Naval Warfare* (Boston, 1917), Introduction, p. xv. The best account of Mahan and his influence is Charles C. Taylor, *The Life of Admiral Mahan* (London, 1920). The history of the Chilean Civil War, 1891, increased the prestige of fleets by demonstrating the direct value of the command of the sea at every point of the contest ("The Growth of Confidence in Navies," *Spectator*, Sept., 12th 1891; Brassey's *Naval Annual*, 1892, Ch. VIII).

² Admiral Fisher's opinion of Colomb is interesting: "He is not a naval authority and he never comes to the point. He is now called a 'Column and a half' in view of his lengthy letters" (private letter).

a much more popular movement than its predecessors; in that year occurred the greatest of all English navy scares, excepting that of 1909. During the Napoleonic Wars, the Royal Navy had been supreme in Europe, and after Trafalgar it was unchallenged. But in the first three decades of the ironclad era the fleet was allowed to decline. However, until the Eighties, the position of England as a sea Power was relatively safe, for France, ever her chief rival, was busy with the reorganization of her army after the debacle in 1870. After 1880, all this was changed: intensive naval building programmes on the Continent coupled with a threatening international situation resulted in the little scare of 1884 and the more serious one in 1888, when Franco-Russian alliance rumours were in the air. The Salisbury Government trimmed its sails to meet the breeze, and brought in the Naval Defence Act of 1889. This provided for a £21,500,000 programme which included eight first-class and two second-class battleships, and established the principle of the "Two Power Standard," i.e., that the British Navy "should be on such a scale that it should be at least equal to the naval strength of any other two countries. . . ." ¹

The new programme placed the Navy on a satisfactory footing relative to what was then the normal rate of shipbuilding abroad. Should this not increase substantially, the superiority of England to her two closest rivals would be maintained at least up to the end of the financial year 1893-94, when the Naval Defence Act was due to expire. There was no reason to expect any great advance in foreign construction. The English Government were naïve enough to suppose that a sizeable enlargement of their fleet would not excite emulation elsewhere. "Will this scheme," asked Lord George Hamilton, the First Lord of the Admiralty, "lead to increased expenditure on the part of foreign nations? I think not. We do not attempt to vie with foreign nations in the magnitude of their land forces . . . if there are any nations abroad who do wish to compete with us in naval armaments, the mere enunciation of this scheme will show to them the utter futility of their desire." ²

Unfortunately, this expectation was not realized. With the passage of the Naval Defence Act begins the first chapter of the modern race in naval armaments. There can be no doubt that the Act served as a stimulus to France and Russia, though this was always denied by the Conservatives. An even more powerful stimulus was Mahan's volumes.

¹ Hansard, *Parliamentary Debates*, 3rd ser., CCCXXXIII, 1171 (Mar. 7, 1889). For the vicissitudes of the Two Power Standard see App. II in E. L. Woodward, *Great Britain and the German Navy* (London, 1935).

² *Ibid.*, 1190-91 (Mar. 7, 1889).

In a nutshell, despite the Naval Defence Act, Britain was no better off in 1893 than in 1888. Her two leading rivals were hot on her heels. In battleships built and building she was just equal in numbers to her rivals: 47 to 30 French and 16 Russian. But the significant fact is that the French and Russian totals included more ships building, hence a more up-to-date fleet in the making.

Naval policy is intimately linked with foreign policy. As in 1884 and 1888, the troubled state of Britain's foreign relations in 1893 (Egypt, Siam, the Pamirs), coinciding as they did with the threatened loss of naval supremacy, furnished the material for the navy scare of 1893. The spark was ignited by the Toulon visit of the Russian Baltic Fleet in October and the establishment of a Russian squadron in the Mediterranean. Public attention was focused on that sea, where it was realized the whole balance of naval power had changed and the English fleet might be in a precarious position. The Toulon visit suggested the possibility, even the probability, of a Franco-Russian naval coalition against England—a combination whose overwhelming superiority and strategic advantage might result in a decisive defeat and her expulsion from that sea where the British flag had flown for almost two centuries.

There followed a first-class navy scare. "The panic-mongers are abroad," wrote a *Daily News* correspondent, "and venerable Admirals are joining juvenile politicians in their attempts to prove that the British fleet, if it has not already gone to the dogs, is at least on its way to them." October to December of that year were hectic months: leading articles, special articles, and voluminous correspondence in the newspapers, political speeches and meetings by the score, questions in Parliament, private letters to the First Lord, resolutions passed by political associations and chambers of commerce. The upshot was the Spenser programme of new construction in 1894, which included seven powerful battleships. The scare was over, but there remained an uneasy feeling about the ability of the Navy to cope with a Franco-Russian combination on the sea. Owing to the continued naval activity on the Continent, Britain was no better off in 1900 than she was in 1894; in fact, relatively speaking, she was losing ground after 1898 because of the development of the Kaiser's High Sea Fleet. Though there was no "scare" after 1893, there was an almost unceasing agitation for naval increases, and the estimates were regularly augmented. The change in the Press was remarkable: every newspaper of any importance now recorded naval intelligence, naval matters were often the subject of leaders and articles, and special correspondents were sent to the annual fleet manœuvres.

The chief lesson of the Kruger telegram and Fashoda crises was, the people were taught by a host of writers in the Press, the lesson of

sea power. "It was the old story retold of the strong man armed—a just nation preserving peace by its preparedness for war." Nor were the people allowed to forget that it was British sea power which had deterred the Continental Powers from intervening during the Boer War. The Sino-Japanese War of 1894-95 and the Spanish-American War also afforded further striking examples of the influence of sea power.

On 26th June, 1897, there occurred one of the most impressive incidents of the Queen's Diamond Jubilee, the naval review at Spithead. It was more than a mere review or ceremonial pageant; it was a demonstration to the world of Britain's sea power: 165 modern fighting ships of all classes, the flower of the Royal Navy, passed in review before the Queen and her distinguished foreign visitors. There were thirty miles of ships in five lines, each over five miles in length. Not a single post abroad was weakened to produce this great muster at Spithead. Only the modern units in home waters were used. It was the greatest display of naval force the world had ever seen, and roused the enthusiasm of all who witnessed it. The review instilled in Englishmen a spirit of pride and confidence in their Navy.

In the same way, although it was not so ostentatious, the Government revived the practice of popularizing the Navy by sending the Home Fleet on "Hurrah trips" round the coasts of England.

A very important factor in converting the "man in the street" was the Navy League, founded at the close of 1894 "to secure as the primary object of the national policy the command of the sea." The methods used by the League to awaken the public to the importance of the Navy included letters and articles in the Press, literature of their own, lectures and addresses, the commemoration of Trafalgar Day, and the formation of a Parliamentary Committee which was in "close communion with certain Members." The arguments employed by the League in all its work were the familiar ones of the "command of the sea," its meaning and vital necessity for Great Britain. It was in considerable measure due to the intensive preaching of these ideas by the League that they became commonplace and intelligible to the country at large. The writings of Spenser Wilkinson, Colomb, and even Mahan could reach only a limited public, whereas the League's incessant pamphlet and leaflet broadsides and the use of the other paraphernalia of propaganda reached a much wider public. In particular, the League set itself the task of enlightening the British public as a whole, for on last analysis their votes determined all national issues. The Navy League, aided by Lord Charles Beresford and the Service generally, devoted considerable attention to the younger generation, working largely through the schools. As the Chairman of the Executive Committee stated at the third annual

meeting of the League, "The British Empire is not only for to-day but for all time, and if we do not attempt to get at the juniors we cannot expect our future endeavours to bear much fruit." Captain S. Eardley-Wilmot, a prominent Navy Leaguer, was the principal lecturer to the juveniles. He also wrote many articles on "The Navy as a Profession," with the object of stimulating the interest of boys in a naval career. There were many books of this kind, for example Admiral Montague's little book, *A Middy's Recollections*, and *Hurrah for the Life of a Sailor!* by Vice-Admiral Sir William Kennedy. Hardly a month passed from 1894 without the appearance in the popular magazines of several articles descriptive of life and customs in the Service. Admiral Colomb led the way in 1897 in a movement towards reviving the study of naval history at the public schools by starting an annual naval essay contest in one of the public schools. The Universities, too, were infected with the big-navy typhus. There were flourishing branches of the League at Oxford and Cambridge. It was significant that, in 1895, Cambridge chose a naval subject for its Latin essay—"British Sea Power." In December, 1896, a student debate was held at the University on the motion that "an increase of the expenditure on the Navy is desirable." On a division being taken, 101 voted for and 38 against the motion.

It is clear that by the turn of the century the country was navally-minded. All classes had, or thought they had, something to gain from the growth of the Navy, whether security, empire, trade, employment, or dividends. Even the Church itself took up the cause, and Dr. Spence Watson asked where the bishops were while the Navy was being steadily increased. "Why were they dumb dogs when the cause of their master was at stake?"¹ The leading Catholic organ—the *Catholic Times*, and the *Church Times*—which had the largest circulation of any Church of England newspaper, were staunch navalist journals.² The Anglican weekly *Guardian* was so rabidly navalist that it criticized the huge estimates of 1896 as not going far enough.³ The Congregationalist weekly *Independent and Nonconformist* asserted: "As to 'Big Navy men,' every true English patriot answers to this description. We know not where to find a sane man who would leave our vast Empire at the mercy of accident."⁴ The Nonconformist *Christian World*, representing all the Evangelical denominations, was at first saddened by the growth of the Navy estimates, but changed its opinion by 1897—"in the

¹ *Herald of Peace*, Apr., 1897.

² *Catholic Times*, Dec. 15, 1893, Jan. 26, Mar. 23, 1894, Aug. 5, 1898; *Church Times*, Dec. 22, 29, 1893, Mar. 22, 1894, July 2, 1897, July 29, 1898.

³ Nov. 8, 15, 22, Dec. 28, 1893, Mar. 4, 11, 1896.

⁴ Mar. 5, 19, 1896.

efficiency of her first line of defence . . . lies England's greatest hope of European peace."¹

There were some navalists who maintained that the people were ignorant of and apathetic toward the Navy. The *Saturday Review* wrote: "It is extraordinary how little genuine interest the public take in the Navy. In order to hold their flagging attention it is necessary that they should be continually stimulated by the speeches and letters of statesmen and experts" (Dec. 5, 1896). The *Army and Navy Gazette* often bemoaned the lack of public interest in the Navy. If "public interest" be defined as a sustained, fervid, emotional feeling, such as characterized the Armenian agitation, then it must be admitted that the average Englishman did not display very much interest in the Navy. But if we take a broader interpretation of the term, there can be no question about the interest of the "man in the street" in the Navy.² The statements of navalist journals about the popularity of a vigorous naval policy with all classes may be open to suspicion, but not the confessions of "little navy" organs. The *Investors' Review* declared that it was almost useless to protest against the naval increases. "All classes of the nation appear to be bitten by the craze" (Apr., 1896). The protests of Sir Wilfred Lawson and Henry Labouchere against the 1896 estimates were accompanied by an admission that the masses were in favour of an even larger Navy. In Lawson's words:

"We hoped two or three voices would be raised to-night in support of the good old cause of peace, retrenchment and reform. (Laughter). Yes, the whole thing had become a joke now. And, what was worse, he believed the Hon. Members represented their constituents in so regarding it. He believed the working men were as keen on spending this money as the House of Commons was."³

The awakening of public opinion to the importance of naval supremacy is especially well reflected in its effects on the book trade. "The lay circles of literature," remarked Admiral Colomb, "are more naval than the ward-rooms of our ships of war."⁴ More books on naval

¹ Ibid.—Mar. 14, 1895, Mar. 5, 1896, July 1, 1897.

² See, for instance, *Admiralty and Horse Guards Gazette*, Sept. 3, 1896, and the pamphlet, "Our Silent Navy. Is It Forgotten?" (the *Navy and the Empire Series*, No. 1, London, 1904), a series of replies by twenty-three of the leading naval authorities, professional and lay, of the day to the question: "What do you consider the best means of creating among the General Public a real interest and sympathy towards the Navy?" The consensus of opinion was that there already existed a general interest and sympathy toward the Navy, but that there was still room for development.

³ Hansard, 4th ser., XXXVIII, col. 402 (Mar. 6, 1896). See also the *Arbitrator*, July, 1898; *Investors' Review*, July 29, 1898; the *Quaker Friend*, July 19, 1895.

⁴ *Saturday Review* (Supplement), Apr. 3, 1897.

history, naval biography, and other subjects connected with the Navy were published in the period 1888-98 than in the previous thirty years.¹ The writings of Admiral Colomb and Captain Mahan gave a great impulse to the study of naval history, especially of that great illustration of sea power, Trafalgar. There was a veritable torrent of naval biography. Before the nineties there was no spark of interest in the lives of Admirals; but this attitude was now changed, "because the public was beginning to appreciate the Navy, it was also able to appreciate its makers."²

The poetry and novels of the period are other manifestations of the new popular interest in the Royal Navy. Henry Newbolt's little volume of stirring and vigorous verse, *Admirals All*, published in 1898, reached a sixth edition in a few months, something which could not have happened ten years before. Novels like W. Clark Russell's *The Romance of a Midshipman* (1898) had a brisk sale.

Echoes of the revival of public interest in the sea service were heard in the theatres. Plays dealing with life on board Her Majesty's warships were *à la mode*, and, while they were not of high artistic merit, they were very popular.³ One was a naval melodrama entitled "True Blue," which was produced in London in March, 1896. Another nautical play in 1896 was "Black-Eyed Susan," also a success, and this was followed by a five-act drama founded on the relations between Nelson and Lady Hamilton. In addition to the plays dealing wholly with the Navy, we find the naval officer drawn by Miss Clo Graves in "A Mother of Three," by Owen Hall in "The Geisha," and by Arthur Bourchier in "The New Baby"—to cite three specimens of 1896 drama. "What is obvious," said the *Army and Navy Gazette*, "is the fact that here are three writers who presumably know their public, and who have deliberately chosen to put a seaman on the stage when a bagman would have suited their purpose equally well, if there was not a very universal feeling just at present that the Navy is very much in people's minds" (May 2, 1896).

¹ *Edinburgh Review*, July, 1898.

² John Leyland, "Recent Naval Literature": *Brassey*, 1897, ch. XI; "Recent Naval Biography and Criticism," *Blackwoods' Magazine*, Mar. 1897; David Hannay, "The Teaching of Naval History," *New Review*, Feb., 1895; Prof. J. K. Laughton, "The Study of Naval History," *Journal of the R.U.S.I.*, July, 1896.

³ A. T. Q. C., in the *Speaker* ("A Literary Causerie, 'Admirals All,'" Feb. 26, 1898), found it hard to "stomach choruses of mimic tars capering on the boards, and tenors or baritones in uniforms of blue singing braggart songs for the applause of the gallery—no, I am quite wrong: the applause from the stalls is quite as vociferous."

THE PSYCHOLOGY OF THE GERMAN REGIMENTAL OFFICER

By "EUROLLYDON."

THE momentous changes which are taking place within the German army, fraught with so many unknown, but not unimaginable consequences, make an analysis of the position of the officer, his origin and his outlook, a matter of some interest. Social progress, and consequently national constitutional development, have not followed the same or even parallel courses in England and Germany. A close study of the historical background, for which there is insufficient space here, is necessary if an accurate appreciation of German political and social prejudices which have so much bearing on the psychology of the officer is to be made. The limited and localized scope of the Liberal movement in politics; the abolition of villeinage within the last century only; the origins of the gulf between the civic and agrarian populations: all these factors and many others whose origins are deep in German history, and whose elimination in English affairs was largely completed by the end of the XVIth Century, are still matters to be reckoned with in the cosmos of modern Germany. They have much scope for interplay within a great corporation officered from every section of the community. The stress of National Socialism in its attempt to solve in a decade, what it has taken centuries and an island situation to accomplish in this country, must inevitably give them prominence before the new *Weltanschauung* can eliminate them.

As soon as the great expansion of Germany's army began to take place there arose an urgent demand for young officers, and the traditional sources found themselves unable to supply the personnel whose admission would alone guarantee the continuance of their order in the control of the greatest of all the organs of power in Germany and in Europe. The men who should have been available to fill the vacuum and maintain the supremacy of their order had taken over the positions vacated by the Jews in the professions and in commerce, and were busily engaged in restoring their fortunes lost during the period of gross inflation. The time for estimation of the full effect of the expulsion of the Jews is not yet, but against the gain to the individual German who has found employment and against the benefit to society which the spread of upper-class employment into professional spheres carries with it must be set the loss to the army of its reservoir of officer power, and to the squirearchy a concurrent potential loss of military control.

No other reserve of officers than the war-time soldier existed, and the Burghers, though providing a material proportion of the Reichswehr officers, had not been admitted to the higher regimental posts or to the General Staff in a proportion commensurate with their numbers. To them, therefore, the army offered no very attractive career; business and the professions continued to attract; and such of their class as were in the reserve, in token of their war service, were no longer active or efficient and were being eliminated in numbers. There only remained as a source of supply the *Kleinburghertum* and the peasantry from which to find junior army leaders in the numbers required, and to them, the foundation of the National Socialist Revolution and rivals for power in the high control of the destinies of Germany, the German High Command have been compelled to turn.

Now these classes in Germany are in no respect comparable with their nearest social counterparts in this country. Owing to long experience of political freedom and the expression of political power; to centuries of growth of social assurance; to the blurring of the dividing lines of social classification until the classification of an individual has become largely invidious; and finally to the growth of a great common political and social tradition of service, the powers of leadership in England have not been the preserve of the few. We can find leaders, certainly junior leaders, on every farm, behind many counters, and in almost every office in the country. The high standard of living and the ease and freedom of movement of all classes has created a breadth of outlook and a sturdiness of demeanour which cannot be denied.

In Germany, the peasantry has barely begun to produce a yeomanry and the *Kleinburghertum* leads a life narrow at any time, but narrower than ever in these days of high cost and low standard of living, press censorship, controlled movement and autarchy. Self-sufficiency is the doom of the wide horizon, be it national or personal. Their education is State controlled until they are ten years old, and is the subject of constant change and experiment. From ten years of age the State reserves the right to take control of their upbringing, and competent educational authorities hold that National Socialism has reduced the efficiency of education by at least thirty per cent.

And so the question inevitably arises whence will come the higher army leaders of the future and what will be their quality? Will the young aristocracy come forward in sufficient numbers to retain control of the General Staff and of the regimental Higher Command through whose recommendation the General Staff must be fed? If they do, will they be any better prepared for leadership, or will the new entry gradually absorb control of the seats of power? If so, will they rise

to the occasion and maintain efficiency, or will the defects of the political and social history of their class in their country prove too much for the sudden demand and a less efficient structure take the place of the old aristocratic tradition? Finally, will the new order so displace the old that, when they have occupied the seats of power in the military forces, their class—the political backbone of National Socialism, will be able to proceed unhindered to the political extinction of the aristocratic and big business strata, which have for the last few years diverted the path and checked the momentum of what began as a peasant and lower-class movement?

Whatever the answer to these questions, the inequality of social and political development and the consequent sectional interest and occulted vision of the classes concerned demands a relativity of judgment for which English comparisons are of little value. Psychological unity is clearly impossible.

With these questions and considerations before us it is possible to conclude with an examination of the outlook of the individual officer during this period of expansion and social change within the army. The old aristocracy still control the General Staff and the regimental commands. Where they do not in actual fact do so, their nominees are bound to them by tradition of service and by economic circumstances. These officers view the present Government with disfavour tempered by respect for its achievements. This disfavour is a blend of three aspects of their existence. First of all they regard with strong suspicion the economic policy of which autarchy is the most convenient expression; next they view the upheaval caused by the introduction of officers of a class or classes which they have hitherto viewed—and the social history of their country provides them with some excuse—as immeasurably their inferiors, as a catastrophe for their regiments and for their order, and for their pleasant social existence, while for the social existence of their womenfolk it seems a more than unwelcome change: finally the expansion of their army has broken up the regiments which they have known and served for nearly twenty years and which had inherited the traditions of the old army, and has substituted an agglomerate of half-trained units, destitute of tradition, officered by strangers, and owing allegiance to new gods. Small wonder that, where they can, they stress their connection with the past and cling even more tenaciously to forms and methods which have possibly lost their value and their meaning.

Next is the *Burgher* officer, many drawn directly into the army from civil life during the expansion, and many of the old *Reichswehr*; many of these the descendants of military families of long standing.

To those of liberal thought and origin and without a long-standing military tradition, the present regime, with its totalitarian methods, its tendentious press, and its fetters upon travel and broad intercourse is repellent. Since the army is still very much a law unto itself, they hope in its service to seek salvation, and to aid their country to find it. To others, more accustomed to the exigencies of military convention, the army is merely a way of life chosen, tolerated, pursued, and laid down when the end comes. Imagination and unrest play little part in their lives. It is, however, from the liberally educated section drawn in from civilian avocations, with liberal political traditions, that, despite their low numbers, disturbing political and economic manifestations will come. Protected within the mantle of independence upon which the army has insisted, their speech is reason, and reason will be heard. If they recognize Weimar as an error, they regard the Brown House as something intolerable, and autarchy as an impossible attainment. They remember the War, the fall of the mark, and all else that defeat brought in its train. Their civilian origin is very real to them. They do not desire war for war's sake. One thing binds the aristocrat and the *Burgher* together. D'Urbevilles are determined never to sink to the condition of Darbeyfields.

Finally there is the new entry. A sprinkling of the squirearchy; an admixture of the *Burgher*; and the lump and leaven from the lower middle class, and from the nascent yeomanry and peasantry, make up this corps of youth. From nearly all, the clear-cut appeal of National Socialism to youth finds a response. The rejection of compromise is an expression of the emotion of their years. To the great majority, drawn from homes naturally cramped in themselves, condemned in ordinary times to colourless careers in the narrowest of surroundings, to-day further confined by the restrictions imposed by the State and by individual economic necessity, such an opportunity for self-revelation and for leadership is an almost inconceivable apotheosis. To rise from a position of accepted subordination and inferiority to the proud position of a Prussian officer is a reward to its supporters which few governments can equal under such circumstances. Since to this prestige an adequate rate of pay and congenial conditions of living have been added, there can be little doubt that the National Socialist Government has captured a key position within the closest preserve of ancient privilege, whence future levelling operations will not only be easy but will become inevitable and necessary. To these officers, young as they are—and the gulf of age is not the least of the gulfs to be bridged—and with such upbringing, Goering and Goebbels are heroes, and Hitler is inspired beyond the powers of mere man. The press and its propaganda, created openly and avowedly to deal with such mentality, is a gospel of truth. The

social exclusiveness of their present superiors will be merely one more reason for a determination to supplant them.

In our country, even with the infinite shading of degree which marks our social system and the common tradition and common basis of social and political life which we have shared for so long, the new army officer responded often reluctantly to the attempts of the old army to lead him, or at times perhaps to dragoon him into the custom and formalism of the past. So also in the German army does acquiescence, born of pride in this unexpected good fortune and in the conquest of so exclusive a barrier, find itself in conflict with resentment at a social exclusiveness which has survived the destruction of professional exclusiveness. Some still accept this social barrier as being in the nature of things; some of the socially exclusive have determined that the conquest of the invasion is best met by absorption and have gone more than half-way to meet the new element. But this fact emerges from the welter of change and ferment, unless war intervenes and the necessities of war refresh from the reserve and civilian sources the dwindling stock of the old paramount class, twenty years of peace will see in control of the army the product of National Socialism. The army once lost, the old order is lost as well. To provide a common working basis and to mask these diverse origins, there is of course a rigorous code of etiquette. Every public school boy in England accepts and suffers such a code, that ordinary intercourse may continue between great and small on the common ground of new association without recourse to outside and possibly unshared formalisms which might cause resentment. It is a code which recognizes as its basis the mutual possession of a commonality of status, be it of a great army with a great tradition, or of a great school with an historic past. As at school, so in the German army relaxation may come in the rigorous application of the code as the instincts and habits of the newcomer become steeped in those of the community at large.

On the senior regimental officers of to-day—and they are being selected from the elect with the greatest of care—lies a tremendous responsibility. They are charged with the education of youth, not only professionally as leaders and soldiers but by example, socially and politically, so that they may be brought within the broad embrace of the officer class and may accept as time passes the perpetuation of the dominion of the squirearchy. It is a critical phase in the struggle for survival. Whatever the outcome of this internal struggle, the leadership of the army, even by the pick of the new entry after a number of years, will lack the more spacious outlook of the old regime. It is not so much that blood will tell as that early lack of opportunity and smothering political and economic propaganda will tip the scale.

As in all such social problems, the narrow social exclusiveness of the women is playing an adverse part, not only in the solution of the inner problems which have arisen, but in shaping the officer's outlook on world affairs. For example, friendship with England and with things English is an important factor of German policy, but held in reserve is the demand for colonial expansion which is calculated to reverse, as and when policy demands a change of front, this anglophil bias. Here the women, more easily influenced by the subjective, are an indication of the future, and are in advance of their menkind in their clamour for colonies and their dislike of England and the English.

In two respects particularly, the whole corps of German officers is united—the maintenance of high standards of man management and horse mastership. This is not to say that the time given to the horse is not a serious inroad on other demands for professional efficiency. It is, but German policy demands the horse and there the matter must lie. In man management the Germans have followed our precept, and the absence of the young officer's motor car is to them a positive gain. In England, alas! the subaltern's motor car only too often extends his outlook no further than by the distance between Constitution Hill and Piccadilly Circus and provides him with unlimited opportunity for short absences from his garrison and from his men. In urgent times, such as exist in Germany to-day, lack of transport is an advantage. The baton in the young officer's knapsack is not of much importance when he is learning and exercising his duties in handling, training, and educating newly-formed and untrained troops. Therefore let the outlook of the young officer remain narrow until this emergency is past and the spirit of the new army inextinguishably kindled. The narrower the garrison life, the more the officer is thrown upon his men for self-employment and recreation; a more efficient young Regimental Officer will be the result.

For a few short years the German army will be unready for war with any first-class Power. Nevertheless, in Germany's present condition of economic and political uncertainty it may be that a moment of danger will arise when the National Socialist Party sees economic collapse impending. What concerns us more in this paper is that yet another dangerous moment will arise. That moment will be when the Great General Staff can no longer, save by war, postpone the surrender of army control into the hands of the masters of the 1936-39 entry. And so, in the end, the peace of Europe may depend to a great extent on the successful handling by the regimental commanders and by their ladies, of the psychology of the new German regimental officers.

Let us hope that tolerance and vision may prevail.

THE ALDERSHOT COMMAND INTER-DIVISIONAL EXERCISE, 1937.

By LIEUT.-COLONEL A. G. ARMSTRONG, *p.s.c.*

Indian Regular Reserve of Officers.

THE framers of the Aldershot Command Inter-Divisional Exercises, which were held this year from 9th-11th September, South-East of Cambridge, had three main objects in view :—

Firstly : to practise units and formations of the Aldershot Command in mechanized movement and tactics.

Secondly : to run-in the staffs of the 1st and 2nd Divisions under conditions approximating to those of active service.

And thirdly : to provide an opportunity for a battle of wits between the Commanders of the 1st and 2nd Divisions.

The opposing Commanders were both men with considerable and varied experience of war. Major-General C. C. Armitage, C.B., C.M.G., D.S.O., Commander, 1st Division, who is 55 years of age, joined the Royal Artillery in 1900 and sailed straight off to the South African War, 1901-02. He fought again in France and Belgium, 1914-18, and was awarded seven mentions in dispatches and the Brevet of Lieutenant-Colonel for his distinguished services ; he further received a C.M.G. and D.S.O. and Bar. He has had wide experience on the Staff, commanded the Staff College and was G.O.C. of a Division in Palestine only last year.

Brigadier (now Major-General) F. P. Nosworthy, D.S.O., M.C., was acting as the temporary Commander of the 2nd Division in the place of Major-General H. M. Wilson, C.B., D.S.O., who was debarred from exercising his command owing to pre-knowledge of the conditions governing the manœuvres. Brigadier Nosworthy is the permanent Commander of the 5th Infantry Brigade, the control of which passed to another officer for the period of the Exercises. He is six years younger than Major-General Armitage and became a "Sapper" in 1907. He served in France and Belgium from 1914-18 ; Afghanistan and the N.W. Frontier, 1919 ; Sudan Defence Force, 1926-30 ; and as G.S.O.I, China, 1932-35. He was honoured by six mentions in dispatches, two Brevet Promotions, D.S.O. and Bar ; and M.C. and Bar. He was twice wounded.

into a formidable mountain range extending from Cambridge in the North to Hatfield in the South, and traversed by only a few roads, as shown on the sketch-map. The base for the Insurgent forces besieging London in the Northern Sector was Hitchin. The frontier between Hertford and East Anglia ran as drawn on the map. The population of Hertford was mainly pro-Insurgent and that of East Anglia, pro-Government, but the whole theatre of war was infested by spies of both sides. In addition to their other troubles, the unfortunate inhabitants of these islands had suffered a severe encroachment of the sea, which had irrupted on the East to a distance of about twenty-five miles, leaving the existing coast to stand on the line Norwich-Lavenham-Sudbury-Halstead-Witham-Maldon-Thames Estuary.

The object of these changes, which were by no means arbitrary, was to restrict the area open to manœuvre by the opposing Commanders to a belt about twenty-five miles wide and of a similar depth, inside the square marked by the towns of Cambridge-Bury St. Edmunds-Witham-Hertford. This area—over 600 square miles in extent—was judged to be wide enough to give the opposing forces ample room to manœuvre and yet narrow enough to ensure close tactical contact between them. These expectations were fulfilled.

Owing to the fratricidal nature of the conflict—members of one family often belonging to opposing camps—much fuller information of impending military activity was obtainable than would normally be the case; and the following situation was common knowledge to both sides.

GENERAL IDEA

The garrison of London was preparing a counter-offensive on the South-West sector towards Woking and Guildford, and was awaiting reinforcements from Norwich, 109 miles away to the North-East. At this point, the Government 1st Corps, consisting of the 2nd and 3rd Divisions, with a proportion of Corps troops, medium artillery and engineer units were completing their arrangements to march on London and were collecting lorries and cars to transport their unmechanized infantry.

The Insurgents who, were concentrating South-West of London in anticipation of the threatened counter-offensive, were known to be short of troops in the North and to be depleting their forces in the Hertford sector with a view to building up a central reserve. So far only two weak infantry brigades of the 1st (Insurgent) Division had been concentrated at Hitchin, together with some divisional troops, medium artillery and horsed cavalry; difficulties were being experienced with the

impressment of civilian motor vehicles ; and some armoured cars, which were to join the Division, had been delayed.

Both sides had powerful air forces and were well-equipped with anti-aircraft artillery and machine-guns.

SPECIAL IDEA (GOVERNMENT)

The initiative, for the time being at any rate, seemed to have passed to the Government, and on the evening of 7th September, the Commander 1st (Government) Corps, sent for Brigadier Nosworthy, commanding the 2nd Division, and gave him certain orders, of which the following is the gist :—

G.H.Q., he said, had decided to launch the counter-offensive from London early on 14th September ; the role of the 1st Corps was to reinforce the garrison and co-operate in this counter-offensive ; but before doing so, the Government communications with Norwich, *via* Newmarket-Bishop's Stortford, were fully to be restored and protected from possible interference by Insurgent forces based on Hitchin ; this task, primary in point of time but secondary in actual importance, was allotted to the 2nd Division whose mission was to defeat the 1st (Insurgent) Division should they issue from the shelter of the Chilterns or, if they remained inactive, to deny them the eastern exits from the Buntingford defile. The Commander, 1st Corps, further pointed out to Brigadier Nosworthy that a threat to the Buntingford defile must either bring the Insurgents to battle, when they might be crushed, or force them to withdraw into the mountains where a small detachment would be sufficient to bottle them up, freeing the bulk of the 2nd Division to co-operate with the operations round London ; as soon as this object was achieved, the bulk of the 1st Corps would march on London.

As is so often the case in war, the ruling factor in this operation was that of *time*. To co-operate with the London garrison early on 14th September, the bulk of the 1st Corps would have to reach the vicinity of the capital by the evening of the 12th ; this would involve starting from Norwich early on the 10th (at latest) ; moreover, the 2nd Division, if it were to pull its weight in the counter-offensive, would also have to reach London by the 12th. Allowing for one day (the 12th) in which to effect the transfer from the Buntingford area, the 2nd Division disposed of only four days in which to carry out its task.

And to make matters worse, owing to vexatious delays in the assembly of his lorries, the Commander of the 2nd Division was not in a position to march South from Thetford before 0500 hours on 9th September, thus losing one of his four precious days. Thus, although Brigadier

Nosworthy commanded forces initially superior to his opponent, the time factor was so ingeniously contrived that the balance of opportunity seemed, at any rate on paper, slightly to be against him.

SPECIAL IDEA (INSURGENT)

At Insurgent H.Q., reliable information had been received that the Government counter-offensive was scheduled to begin by the middle of the month and that it would be delivered by the London garrison in co-operation with the 1st Corps from Norwich. In order to defeat this manoeuvre, G.H.Q. sent, on 7th September, the following instructions to the Commander, 1st (Insurgent) Division at Hitchin: the enemy's 1st Corps, which comprised two Divisions, each stronger than the 1st Division, was too strong for the Insurgent Commander, who hardly could hope to deny some reinforcements reaching London from the North-East; at the same time, the Government L. of C. from Norwich to London was vital to them as they could not be content to draft reinforcements into the capital at the expense of having their communications cut behind them. It was, therefore, almost certain that the enemy would detach initially sufficient forces to contain or defeat the 1st Division, while introducing the rest into London, hoping perhaps to follow them up later with the detachment that had dealt with that Division.

G.H.Q. proposed to reinforce Major-General Armitage with all the troops that they could lay hands on. These, however, did not amount to much in mere numbers, as by the evening of 8th September only one squadron 12th Lancers (armoured cars), one Field Company R.E., and the 2nd East Surreys (Machine-gun battalion) could be promised. Later, possibly by 10th or 11th September, a further infantry brigade and a field artillery brigade would, it was anticipated, reach Major-General Armitage; trouble was still being experienced with the shortage of motor transport and the utmost that G.H.Q. could give the 1st Division at the moment was sufficient M.T. to embuss one rifle battalion. The reinforcing infantry brigade (with the exception of one battalion) would be motorized fully.

The Commander-in-Chief's view was that if the presence of these reinforcements could be kept secret, the 1st Division might be able to bring off a real victory against any detachment sent against them, and constitute such a threat to the Government L. of C. as to deter the bulk of the 1st Corps from marching on London at all. Two points were impressed on Major-General Armitage:

Firstly, that his Achilles' heel was the defile East of Buntingford; if the enemy secured this defile behind him, his surrender would be only

a matter of time ; and *secondly*, that a passive attitude on his part was unlikely to achieve his objects ; the enemy would have to be hit as hard and as early as possible.

RELATIVE STRENGTHS

By midnight on the 8th September, the whole of Brigadier Northworth's 2nd Division was concentrated in the area of Wangford-Thetford-Barnham. Under his command were :

Cavalry.—3rd Hussars (mechanized), "C" squadron 12th Lancers (armoured cars).

Artillery.—H.Q., R.A., 2nd Division ; 10th, 13th, 18th and 32nd Field Brigades, R.A. ; H.Q., 4th Anti-Aircraft Brigade, R.A. ; "A," "B" and "D" A.A. Batteries ; 2nd Medium Brigade, R.A. ; one section 1st Survey Company, R.A.

Engineers.—H.Q., R.E., 2nd Division ; 5th, 11th and 38th Field Companies, 19th Field Survey Company, R.E.

Infantry.—4th (Guards) Brigade ; Brigade H.Q. and signal section, 1st Grenadiers, 1st Coldstream, and 1st Welsh Guards.

5th Infantry Brigade ; Brigade H.Q. and signal section, 2nd King's Own ; 2nd Leicesters ; 1st Worcestershire.

6th Infantry Brigade ; Bde. H.Q. and signal section ; 2nd Duke of Cornwall's ; 1st South Staffs, no third battalion.

Machine-gun battalions (Mechanized).—2nd Royal Scots Fusiliers ; 1st Royal Welch Fusiliers.

Signals.—2nd Divisional Signals.

Tanks.—4th Battalion, Royal Tank Corps.

Administrative units.—R.A.S.C., R.A.M.C. Provost and Postal detachments.

Royal Air Force.—4th (Army Co-operation) squadron ; 18th (Light Bomber) squadron ; 64th (Fighter) squadron, R.A.F., operating from Mildenhall aerodrome.

The Army is, of course, suffering from a grave shortage of effectives, but, considering everything, the strength of units taking part in the Exercise might well have been lower than they were actually ; infantry units—always the worst sufferers—averaged about 300 and Guards regiments rather over 400 men per battalion. Technical units, however, reach more nearly to their full establishments.

General Armitage's 1st Division bivouacked for the night 8th/9th September in the Hormead area, just East of Buntingford. Compared to the Government forces, his numbers seemed almost meagre, but, as

has already been explained, the conditions of the scheme were such as to react slightly in his favour. His forces included :—

Cavalry.—One horsed squadron each from the Greys and the 5th Inniskilling D.G.'s ; 4th Hussars (mechanized, skeleton Regiment) ; one squadron 12th Lancers (armoured cars).

Artillery.—H.Q., R.A., 1st Division ; 2nd, 16th, 19th, 24th Field Brigades ; 3rd Medium Brigade (two batteries only) ; 4th and 6th A.A. Batteries R.A.

Engineers.—H.Q., R.E., 1st Division ; 7th, 23rd, 26th Field Companies ; 6th Field Park Company.

Infantry.—1st (Guards) Brigade ; H.Q. and signal section ; 3rd Coldstream, 2nd Scots Guards, no third battalion.

3rd Infantry Brigade ; H.Q. and signal section ; 2nd Buffs, 2nd Cameronians, no third unit.

Machine-gun battalions (Mechanized).—2nd Royal Northumberland Fusiliers ; 2nd West Yorks ; 2nd East Surreys.

Administrative units.—R.A.S.C., R.A.M.C., Provost and Postal detachments.

Royal Air Force.—13th (Army Co-operation) squadron ; 29th (Fighter) squadron ; 57th (Light Bomber) squadron, R.A.F.

The Insurgents were inferior chiefly in infantry units, marshalling only four rifle battalions compared to the eight of their opponents. In mechanized troops, the odds were more equal, while the Insurgent mechanized M.G. battalions numbered three against the Government's two. The fact that the 1st Division did not appear to be handicapped unduly by its comparative weakness in rifle battalions gives the student of war serious food for thought.

The 4th Battalion, Royal Tank Corps, was the only tank unit represented—apart from cavalry light tanks—and was allotted to the role of infantry (I) tanks ; these are supposed to be thickly-armoured but slow vehicles, whose task is to act in close co-operation with infantry and "to put them on to the position." The whole conception of (I) tanks, however, is the subject of vigorous controversy, into which it is not proposed to plunge in this article.

ROYAL AIR FORCE

The R.A.F. were, it will be noted, present in considerable strength : six squadrons, three on each side, were operating in an area of about 600 square miles and, at times, the air seemed almost congested. All activities on the ground were subject to pitiless scrutiny and the least

exposure to view or tendency to bunch on the road was greeted with a shower of bombs. Nor were the pilots idle by night; equipped with blazing flares, aircraft can reconnoitre by night and engage ground troops seeking to change position under the cloak of darkness. If constant references are not made to the air-squadrons during the Exercises, it is, therefore, not for want of appreciation of their striking power or their capacity for reconnaissance.

THE FIRST PHASE

In order to progress rapidly and bring his enemy to battle at the earliest possible opportunity, Brigadier Nosworthy decided to advance on a three brigade front, with the 4th (Guards) Brigade on the right (West), 6th Infantry Brigade in the centre, and 5th Infantry Brigade on the left. Two roads were allotted to each brigade group, and the objective given was the general line of the high ground South of Abington-Linton-Bartlow-Castle Camps, South of the Granta stream. A general advanced guard for the whole force was dispensed with. Each group was to find its own advanced guard, styled "covering forces with independent mission," organized in detachments consisting of one squadron cavalry light tanks, one mechanized battery R.A. (4.5-in. Hows.), one section R.E., one company of infantry (in trucks), one platoon mechanized machine-guns, and one Anti-Tank (A/T) Platoon.

As a further protection to the motorized main bodies in rear, a so-called "Anti-A.F.V. Rolling Screen" formed from the anti-tank elements (A.T. guns and "Boys" rifles) of the two mechanized M.-G. battalions (2nd Royal Scots Fusiliers and 1st Royal Welch Fusiliers) was set in motion; these battalions, spread out over a very wide front, were to advance by bounds and "leap-frog" through each other on the several objectives. Owing to width of frontage allotted and to difficulties of control, this experiment did not turn out a success, but it was, at any rate, well worth trying. The fact that this measure was evolved shows the real need felt by Commanders for more ample means of reconnaissance and protection in front of the vulnerable M.T. columns of main bodies. A solution may be found in the provision of a second divisional cavalry light tank unit, or by the organization of a special divisional reconnaissance group.

The Insurgent Commander approached his problem from rather a different angle. A special mobile force consisting of 4th Hussars (less one troop), 16th Field Brigade R.A. (less two batteries), R.E. Detachment, and 2nd West Yorks M.-G. Battalion (less one M.-G. Company and two A/T platoons) was detailed to operate on his left (North) flank and to advance rapidly in the general direction of Newmarket. This

force was followed by two brigade groups, 3rd Infantry Brigade on the right and 1st (Guards) Brigade on the left ; the general reserve, consisting of one and a half Field Brigades R.A., 3rd Medium Brigade (less two batteries), R.E. units and the bulk of 2nd East Surrey M.G. battalion, being echeloned in rear. As his two brigade groups consisted chiefly of marching infantry, Major-General Armitage had to be content with the attainment of objectives comparatively near at hand, and ordered them to secure the ridges just East of Great Chesterford-Saffron Walden, East of the River Cam.

FIRST CONTACT

First contact between the opposing forces was effected at 0630 hours, at which time fighter aircraft of both sides were engaged over Newmarket, and A.A. guns of the 2nd (Government) Division were in action covering the transportation of the 4th (Guards) Brigade North of the town ; and a clash took place at Six Mile Bottom between the Insurgent mobile column and a detachment of the 3rd Hussars (light tank Regiment). The speed of advance of the Insurgent mobile column (Commander, Lieut.-Colonel Scott-Cockburn, 4th Hussars) was remarkable, over twenty miles being covered in one hour.

By 0830 hours, the fighting had become much intensified and the 4th (Guards) Brigade Group was in action against the Insurgent 4th Hussars, 12th Lancers armoured cars and the Greys (horsed), on the line Abington-Linton. Two hours later, troops of the 6th Infantry Brigade had extended the line South-East to Bartlow and Castle Camps. The 5th Infantry Brigade Group was in the vicinity of Long Melford.

During the afternoon, the Insurgent 1st (Guards) and 3rd Infantry Brigade Groups marched up from the South-West, crossed the River Cam and deployed on the high ground between the Cam and the Granta. Although the Government mechanized forces—sufficient mechanical transport being available to move two-thirds of the infantry at a time—had covered two miles to his one, the Insurgent Commander had no reason to be dissatisfied with the result of the first day's operations ; he had secured strong tactical positions on his chosen objectives, and above all had torn one day off the few available in the Government calendar.

Later, Major-General Armitage, feeling himself rather in the air—and being anxious for the security of his right flank and for his communications with the Buntingford defile—ordered his troops to withdraw to the line of the River Cam from Duxford to Newport, with the 1st (Guards) Brigade on the left and the 3rd Infantry Brigade on the right, supported by all available artillery ; H.Q. 1st Division were established at Meesdon. A strong defensive position was being prepared in depth by civilian

labour, under the general control of the R.E., along the high ground Elmdon-Arkesdon-Clavering with a view to covering the Chiltern exits. To afford additional insurance for the right, a line of road-blocks and demolitions had been prepared in the area Stansted-Mount Fitchett-Great Dunmow-Bishop's Stortford, and a detachment of the 2nd East Surreys (M.G. Battalion) sent to hold the bridges over the River Stort.

The Government troops, observing the Insurgent withdrawal, followed up cautiously and established themselves for the night 9th/10th on the ridges between the Rivers Granta and Cam, with the 4th (Guards) Brigade on their right (West) and the 6th Infantry Brigade on their left, supported by the 10th and 18th Field Brigades and 2nd Medium Brigade, R.A. ; Divisional H.Q. were set up just East of Stradishall.

ROUND THE FLANK

Brigadier Nosworthy had planned an unpleasant surprise for the Insurgents by initiating a wide encircling detour round their southern flank with the 5th Infantry Brigade. This formation, specially strengthened by the addition of the 3rd Hussars (Light Tank Regiment), "C" squadron 12th Lancers (armoured cars), and 13th Field Brigade, R.A., and, with the whole of its infantry embussed, motored after dark *via* Thaxted and Great Dunmow, with the object of crossing the river in the vicinity of Bishop's Stortford and enveloping the enemy's right. This thirty-mile compass, which came within a hair's breadth of success, created an almost desperate situation for the Insurgent 1st Division. For those interested in the finer points of soldiering, the second day of the Exercises (10th September) afforded a real intellectual treat.

The 5th Infantry Brigade, continuing its march, debussed East of Bishop's Stortford and advanced on the town ; slight opposition was encountered from a thin screen of Insurgent troops, 2nd East Surreys (M.G. battalion), and a few of the latter were taken prisoners. The bridges were soon captured and by 0600 hours, the Brigade was across and West of the river, with its right on Rickling and its left on Berden, a few miles South-East of the Insurgent L. of C. at Brent Pelham.

As soon as this threat was discovered, the 3rd Infantry Brigade formed a defensive flank South-East of Clavering with one Company 2nd Buffs, all available Cavalry, a 4.5-in. How. Battery and two platoons of machine-guns.

The encircling movement had succeeded ; little or nothing lay in front of the 5th Brigade ; and they had surprised the Insurgents completely. Students of military history will note certain points of resemblance between this situation and the position of General Kemball's Division at 0630 hours on 8th March, 1916, in front of the Dujaila

redoubt. In both cases, the chance was offered ; and in neither case was it accepted : " In love, war, and cards, opportunities never recur."

In offering this criticism, however, it should be remembered that a similar situation occurred in nearly every major battle of the Great War. The " gap " and the opportunities were there, but either the Commanders did not appreciate the facts or, if they did, were not in a position to take advantage of them. In modern warfare, the difficulties attending the exploitation of success have been markedly intensified. The 5th Infantry Brigade were, moreover, in an invidious position ; separated by a wide gap from the rest of the 2nd Division, they were far from support ; in front of them and acting on interior lines, lay a hostile force of double their strength, and there was reason to believe that strong enemy reinforcements either had made or were about to make their appearance on the battlefield. By an accident, such as might easily happen in war, an Insurgent soldier of the 2nd East Surreys had been taken prisoner near Bishop's Stortford. Now, this M.G. battalion forms part of—or, rather, is attached to—the 11th Infantry Brigade from Colchester, and this identification would seem to point to the conclusion that the rest of the 11th Brigade would probably be in the vicinity. Suppose it was somewhere in the Buntingford–Brent Pelham–Braughing area, ready to strike a heavy blow at the flank of the 5th Brigade at the opportune moment ?

In brief, the fog of war enveloped the combatants and prudence seemed to be indicated ; the advance of the 5th Brigade was, therefore, halted and a defensive attitude adopted. In order to clear up the situation, the mobile mechanized troops, 3rd Hussars and " C " squadron 12th Lancers, were ordered to push on towards Braughing at first light.

THE CRISIS PASSES

As soon as the Insurgent Commander was informed of the grave danger to his southern flank—and the news took some time to reach him—he ordered a general and immediate withdrawal of the 1st Division, starting at 0800 hours to the line of defended localities, Great Chishall—South of Elmdon–Arkesdon–Clavering–Brent Pelham. In carrying out this reversal, parties of the 2nd Buffs and 2nd Cameronians belonging to the 3rd Infantry Brigade passed across the front of the 5th Brigade and, in the opinion of the umpires, were very severely punished. The Commander, 1st Division, also sent an urgent appeal to his G.H.Q. for all available reinforcements and stressed the dangers of his position.

He received an answer by 1000 hours to the effect that the 11th Infantry Brigade and 14th Field Brigade, R.A., would come under his command at 1300 hours and that their reconnaissance parties were at

his disposal immediately. Pending their arrival, he decided to act strictly on the defensive and ordered work to continue on the Great Chishall-Clavering position but, later, finding that the expected challenge by the 4th (Guards) Brigade on the North was not materializing, he advanced the 1st (Guards) Brigade to the neighbourhood of Elmdon so as to deny this high ground to the enemy and to give more depth to the position.

Brigadier Nosworthy, for his part, hearing of the success of his enveloping drive decided to support it with the 6th Brigade, which crossed the river and pushed West from Saffron Walden. Touch was established with the 5th Brigade about Rickling, but the attack was not pressed home. The 5th Brigade, still apprehensive of a counter-stroke from the South-West, drew in its left flank from Berden so as to face in a more westerly direction covering Manuden. The 4th (Guards) Brigade was delayed by the demolition of the Cam bridges, but continued its progress in a south-westerly direction and gained touch with the enemy 1st (Guards) Brigade about Elmdon.

On the arrival of the 11th Infantry Brigade and attached troops, the Insurgent Commander's first intention was to use them for a counter-stroke towards Saffron Walden. Later, however, due possibly to the increasing threat of the 4th (Guards) Brigade in the North, combined with the slackening of the 5th Brigade pressure in the South, the 11th Brigade was simply diverted to a central position as a general reserve. No further development of importance took place during the day, and sunset on 10th September found the troops facing each other in the positions which they had occupied previously.

But the whole aspect of the war had changed. With the arrival of reinforcements, the Insurgent forces were now approximately equal in strength to those of their opponents and—above all—had successfully surmounted the hazards of the second day. Only one more day, therefore, remained to the Government forces in which to achieve their object, and, as they had been unable to win success when they were in superior strength, what chance could they have now when the odds were more equal?

THE LAST PHASE

The operations of the second day have been reviewed in some detail, as this was the critical and decisive phase of the manœuvres. The events of the third and last day will be described more briefly.

Determined to make a final bid for victory, the Commander, 2nd Division embussed the 6th Brigade after dark from its positions along the Cam and directed it to the area South-East of Newton on the outer

redoubt. In both cases, the chance was offered ; and in neither case was it accepted : " In love, war, and cards, opportunities never recur."

In offering this criticism, however, it should be remembered that a similar situation occurred in nearly every major battle of the Great War. The " gap " and the opportunities were there, but either the Commanders did not appreciate the facts or, if they did, were not in a position to take advantage of them. In modern warfare, the difficulties attending the exploitation of success have been markedly intensified. The 5th Infantry Brigade were, moreover, in an invidious position ; separated by a wide gap from the rest of the 2nd Division, they were far from support ; in front of them and acting on interior lines, lay a hostile force of double their strength, and there was reason to believe that strong enemy reinforcements either had made or were about to make their appearance on the battlefield. By an accident, such as might easily happen in war, an Insurgent soldier of the 2nd East Surreys had been taken prisoner near Bishop's Stortford. Now, this M.G. battalion forms part of—or, rather, is attached to—the 11th Infantry Brigade from Colchester, and this identification would seem to point to the conclusion that the rest of the 11th Brigade would probably be in the vicinity. Suppose it was somewhere in the Buntingford–Brent Pelham–Braughing area, ready to strike a heavy blow at the flank of the 5th Brigade at the opportune moment ?

In brief, the fog of war enveloped the combatants and prudence seemed to be indicated ; the advance of the 5th Brigade was, therefore, halted and a defensive attitude adopted. In order to clear up the situation, the mobile mechanized troops, 3rd Hussars and " C " squadron 12th Lancers, were ordered to push on towards Braughing at first light.

THE CRISIS PASSES

As soon as the Insurgent Commander was informed of the grave danger to his southern flank—and the news took some time to reach him—he ordered a general and immediate withdrawal of the 1st Division, starting at 0800 hours to the line of defended localities, Great Chishall—South of Elmdon—Arkesdon—Clavering—Brent Pelham. In carrying out this reversal, parties of the 2nd Buffs and 2nd Cameronians belonging to the 3rd Infantry Brigade passed across the front of the 5th Brigade and, in the opinion of the umpires, were very severely punished. The Commander, 1st Division, also sent an urgent appeal to his G.H.Q. for all available reinforcements and stressed the dangers of his position.

He received an answer by 1000 hours to the effect that the 11th Infantry Brigade and 14th Field Brigade, R.A., would come under his command at 1300 hours and that their reconnaissance parties were at

his disposal immediately. Pending their arrival, he decided to act strictly on the defensive and ordered work to continue on the Great Chishall-Clavering position but, later, finding that the expected challenge by the 4th (Guards) Brigade on the North was not materializing, he advanced the 1st (Guards) Brigade to the neighbourhood of Elmdon so as to deny this high ground to the enemy and to give more depth to the position.

Brigadier Nosworthy, for his part, hearing of the success of his enveloping drive decided to support it with the 6th Brigade, which crossed the river and pushed West from Saffron Walden. Touch was established with the 5th Brigade about Rickling, but the attack was not pressed home. The 5th Brigade, still apprehensive of a counter-stroke from the South-West, drew in its left flank from Berden so as to face in a more westerly direction covering Manuden. The 4th (Guards) Brigade was delayed by the demolition of the Cam bridges, but continued its progress in a south-westerly direction and gained touch with the enemy 1st (Guards) Brigade about Elmdon.

On the arrival of the 11th Infantry Brigade and attached troops, the Insurgent Commander's first intention was to use them for a counter-stroke towards Saffron Walden. Later, however, due possibly to the increasing threat of the 4th (Guards) Brigade in the North, combined with the slackening of the 5th Brigade pressure in the South, the 11th Brigade was simply diverted to a central position as a general reserve. No further development of importance took place during the day, and sunset on 10th September found the troops facing each other in the positions which they had occupied previously.

But the whole aspect of the war had changed. With the arrival of reinforcements, the Insurgent forces were now approximately equal in strength to those of their opponents and—above all—had successfully surmounted the hazards of the second day. Only one more day, therefore, remained to the Government forces in which to achieve their object, and, as they had been unable to win success when they were in superior strength, what chance could they have now when the odds were more equal?

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(West) flank of the 4th (Guards) Brigade. The 5th Brigade motored into Divisional reserve in the vicinity of Sawston. After some delay, due to the necessity for reconnaissance and for registration of the artillery, the 2nd Division attack was launched at 1000 hours on 11th September against the Great Chishall-Elmdon sector of the Insurgent position.

The defenders were strongly posted in prepared localities, which they had still further strengthened with numerous anti-tank guns and mines. Surprise was almost entirely lacking. In such conditions, the attack could have but little hope of success; and the (I) tanks preceding the assaulting infantry were adjudged to have lost over 50 per cent. of their strength. The Insurgent Commander then directed the 11th Infantry Brigade in a powerful counter-stroke to the North-East, but before the full effect of this blow could be estimated, the Directing Staff ordered the "Cease Fire" to be sounded.

OBSERVATIONS BY THE C.I.G.S.

A week or two later, Field-Marshal Sir Cyril Deverell, Chief of the Imperial General Staff, speaking at the conclusion of the War Office Staff Exercise in East Anglia, pointed certain general lessons of the collective training period.

To gain contact with and maintain pressure on the enemy was, he declared, of vital importance. Opportunities in war were fleeting and might not recur. The spirit of inquisitiveness, determination, and desire to exploit every advantage to the uttermost were the qualities which distinguished keen and well-trained troops.

There was, the Field-Marshal opined, a great deal to learn with regard to the transportation of troops by M.T. Such activities were vulnerable, particularly to ground and air attack and needed special protection. To direct troops, carried in M.T., to an unreconnoitred area without the cover of security troops, was to invite disaster. The best method was, he thought, to advance (or withdraw) by bounds, each spring being covered by a proportion of mobile troops. The terminal of each bound must be reconnoitred beforehand and a "concealment area" selected and notified to all ranks.

Tanks could, in his view, operate under cover of darkness. They would encounter difficulties, such as did other arms in similar circumstances, in co-ordinating and controlling their vehicle columns, but they had certain advantages in the use of spotlights and radio telephony.

Another point touched on was the tendency of Commanders to site their H.Q. too far back. There were many objections to this: touch

was lost easily with the forward bodies; the difficulties of personal reconnaissance by the Commander were enhanced; and an undue strain was liable to be imposed on Signals.

CONCLUSIONS

Exercises in peace are intended to teach cheaply the lessons of war, and, provided these objects have been attained, there can be no value in asking such questions as: "Which side won?" In the absence of bullets, moreover, tactical decisions must be accepted with reserve.

The primary object of these Exercises was to practise units and formations in mechanized movement and tactics. In this connection, Mr. Duff Cooper, speaking as Secretary of State for War, on 17th March, 1937, in the House of Commons, declared that "the change-over from the horse to the internal combustion engine was a revolution which must fully occupy the time and attention of those concerned for many years."

Observers of these manœuvres were in a position fully to corroborate the truth of this statement. The Army is undergoing changes as fundamental as those which affected the Royal Navy when it turned over from sail to steam and from the old "wooden walls" to the iron-clad; not one animal was included in the infantry and artillery composition of either the 1st or 2nd Divisions. Mistakes were made, but, on the whole, the standard of mechanized movement was high. Many of the Army drivers had been at the wheel for only six months, the roads were narrow and dangerous, traffic-control was complicated by the need for permitting civilian transportation, yet accidents were few.

The British Army with its world-wide record of service is nothing if not adaptable and will soon accommodate itself to the new conditions. And the prize is worth striving for. As the Royal Navy has gained immeasurably in striking power by the change-over, so also will the Army when it has mastered its new role.

INDIA'S SEA DEFENCES

By LIEUTENANT-COMMANDER H. E. F. PAINE, R.I.N.

ONE has only to look back on the past to learn what a large part the sea has played in the history of India. To-day there seems to be a tendency among many to regard the North-West Frontier as the only vulnerable part of India. Undoubtedly the security of the Frontier is of vital importance, but India's sea defences cannot afford to be neglected.

If we recall the arrival of the Portuguese in India, we see that they obtained their first footing in the country owing to the superiority of their ships. Later, in spite of the excellent bases they had established all over the East, they lost practically all their possessions through their neglect of sea power. The Dutch to a less extent suffered a similar fate. A French historian, referring to events in India during the War of the Austrian Succession, wrote: "Naval inferiority was the principal cause that arrested the progress of Dupleix." In the Seven Years War the final disappearance of D'Ache with his fleet from Indian waters left the French army powerless, and in the third of the three wars between England and France in India both armies were completely dependent on their fleets. In fact in all three of these wars command of the sea was the vital factor.

It is true that conditions have altered considerably during the past hundred and fifty years, yet let us examine the form which sea attack might take to-day. There appear to be four main possibilities:—

- (a) The landing of a hostile army on some part of India's coast.
- (b) The landing of arms, money, or small bodies of troops to assist rebellion.
- (c) Sudden raids on ports.
- (d) Destruction of commerce.

Let us consider these four in more detail.

As long as India remains a part of the British Empire, and as long as we possess our fleet and bases at such places as Singapore, Aden and Simonstown, there appears to be very little possibility of any hostile country carrying out a successful invasion of India from the sea.

In the census of 1931 the population of India was given at a little over 350,000,000, and, as everyone realizes, this vast figure includes a

great variety of races, religions, and political opinions. Such a country, then, must always be considered as a possibly fertile source for revolution. There are many hundreds of miles of coastline where it would be possible to land arms and money to assist a local rising.

During the late war India had one small experience of the type of attack known as a raid, when Madras was bombarded for a short time by the "Emden." The panic created then was out of all proportion to the amount of damage done. In the next war raids may either take the form of bombardment by ships or of air raids by aircraft launched from cruisers or carriers.

The destruction of commerce is probably from the enemies' point of view the easiest form of attack. Although India is chiefly an agricultural country, her manufacturing industries have increased very greatly within the last few years. The largest of these is the cotton textile industry, closely followed by jute. Her iron and steel output are growing rapidly, as is that of sugar. The total value of India's exports during the year 1935-36 was Rs. 1,605,219,000, an amount which has increased steadily since the year 1932-33. Her chief exports are cotton, jute, jute manufactures, tea, food grains and flour. Her chief imports are cotton and cotton goods, machinery, metals and ores, oils and vehicles, and the total value of her imports during the year 1935-36 was Rs. 1,343,760,000. Taking as a rough estimate, the yearly value of India's imports and exports to be £100,000,000 and £120,000,000 respectively, it will be seen that there is plenty of scope for commerce destruction.

Having found that Indian waters would provide a fairly promising field for raiders, we must next decide what type of raider we should be most likely to encounter. During the late war the most serious menace to our shipping generally was the submarine. To-day many nations maintain large ocean-going submarines, and it is obvious that the possibility of submarine attacks must be kept in mind; also it must not be forgotten that all these nations possess submarine minelayers, therefore minefields laid either by submarines or surface craft may have to be dealt with. But in the Indian Ocean the greatest damage to shipping was caused by the German cruiser "Emden," and in these waters, at any rate, it seems that danger of raiding cruisers will always be far greater than that of submarines. Submarines can to a large extent be guarded against, as convoys escorted by sloops or auxiliary vessels will probably be sufficient to prevent any great damage being done. Such convoys, on the other hand, would only make the raiding cruiser's task simpler: the latter would first sink the escort and then deal with the convoy. The fate of two of our Scandinavian convoys in October and

December, 1917, may be quoted as an example of what might happen, though in those cases the raiders had the advantage of being only a few hours away from their bases. Another factor which will have to be reckoned with is the fact that many of the new foreign cruisers carry several aircraft.

We have now examined in some detail the various types of attack which India's sea defence forces may have to deal with in the future. We have seen that the landing of a hostile army is a highly improbable factor. On the other hand, it is quite obvious that, from a naval point of view, India herself would be quite incapable of dealing with such a situation. With regard to the landing of arms or money, look-out stations on land, and air and sea patrols would seem to be the best remedy. It must be remembered that the smuggling of arms would in all probability be attempted in local craft, therefore a large examination patrol would be required. When it is remembered that as many as a hundred and fifty vessels were searched in a week during the recent Palestine troubles, it will be realized that the number of craft and men which would be required for these more extensive patrols would be very considerable.

The next consideration we come to is raids on ports. This is mainly a matter for the ports themselves to deal with. The larger Indian ports are fortified to a certain extent; but the possibility of raids from the air, however remote they may be, must not be forgotten. Also it must be remembered that a few bombs dropped on an Indian town will probably have a far greater moral effect on the average Indian than the sinking of any number of merchant ships.

Then we come, once again, to the destruction of commerce. We have now seen that we shall have to defend merchant ships from three main forms of attack: cruisers, probably assisted by aircraft; submarines; mines. It is obvious that for some time to come India will have to be dependent on Great Britain for protection against cruisers. She has no cruisers of her own, nor does she seem likely to have any in the near future. On the other hand, Britain cannot afford to place a large number of cruisers in Indian waters merely for the protection of local commerce. With 80,000 miles of trade routes to protect, her cruisers will be required in many places. Against submarines India has already the nucleus of a defence; the few sloops that she has are nothing like sufficient for her needs, but they are a nucleus and, even more important, they are a means of training Indian seamen in gunnery, minesweeping, etc. The same may be said for India's defence against mines; she already has the nucleus of a minesweeping force.

There is another point which might be raised. We have seen that

raiding cruisers will probably benefit greatly by the use of aircraft ; it is obvious, therefore, that defensive air patrols would be equally useful. At present the entire Air Force in India is concentrated in the North. Civil aviation is, however, making moderate progress, and all the main ports have civil flying clubs with a fair number of Indian and European flying members. A system of co-operation with the Royal Air Force—something on the same lines as the scheme followed by the flying clubs in Malaya—might be an excellent method of training those who might wish to volunteer for local defence work in the event of war.

We have now seen that India should be able to provide :—

- (1) A certain number of sloops for convoy work and general duties.
- (2) Sufficient minesweeping craft to look after her own waters.
- (3) A large number of auxiliary vessels for patrol work, etc.
- (4) Air patrols to assist convoy work and defence duties.

Great Britain would have to provide :—

- (5) Battleships, should they ever be necessary.
- (6) Cruisers.

We now come to one final question, that of personnel. It is obvious that on the outbreak of war a great many ships would have to be taken over for patrol duties, etc. All these ships would have to be manned, and a certain percentage of their crews would have to be trained ratings. The question is, where would these ratings come from ? The obvious answer should be the Royal Indian Navy ; but it is very doubtful whether this service, after manning their own ships, will have any ratings to spare for these auxiliary craft. India has at present no reserve force such as the Royal Naval Reserve. The recent decision of the Admiralty to provide war defence training for the officers of the Merchant Navy is one that might well be adopted by India for the instruction of both officers and men ; the extra expense would not be so very great, and she would then be able to make a very appreciable contribution towards her own sea defence in the event of war.

Finally, let me quote part of a recent speech by the Congress President : " Open violence should be met only by force. Open violence, if allowed, will dislocate business and the normal life of the citizens and will lead to communal riots, which is only a form of looting of innocent people. It must be met by effective measures." If war can be considered as " open violence," the above plan, which is entirely a defensive one, should be acceptable to Congress.

THE ROYAL INDIAN NAVY

By LIEUTENANT-COMMANDER J. LAWRENCE, R.I.N.

THE Royal Indian Navy as it stands to-day represents the latest phase of a Service which has been in existence, in one form or another, for over three hundred years. For two and a half centuries it was the sea-going fighting force of the Honourable East India Company. Subsequently it has been known by many other names, and from time to time its functions have varied, but essentially it has remained the same service and its existence has been continuous. The full list of its titles is as follows :—

- 1612 Honourable East India Company's Marine.
- 1686 Bombay Marine.
- 1830 Indian Navy.
- 1863 Bombay Marine.
- 1877 Royal Indian Marine.
- 1934 Royal Indian Navy.

In this article it is not proposed to do more than to trace the development of the Royal Indian Marine, now the Royal Indian Navy, since the outbreak of the War.¹

In August, 1914, the Royal Indian Marine consisted of the following ships :—

- 3 Troopships—the "Hardinge," "Dufferin," and "Northbrook."
- 4 Station Vessels—the "Dalhousie," "Lawrence," "Mayo," and "Minto."
- 2 Surveying Vessels—the "Palinurus" and "Investigator."

The troopships were vessels of approximately 7000 tons, with a speed of 20 knots and armed with from six to eight 4.7-in. guns; they were capable of carrying a thousand troops each. They were very unpopular with the soldiers, who disliked naval discipline; and they were equally unpopular with the Royal Indian Marine, for it was almost impossible to run naval routine in a troopship. One can imagine a captain's indignation when, during Sunday rounds, he found one of

¹ For the earlier history of India's Sea Service the reader is referred to the lecture by Rear-Admiral H. L. Mawby, C.B., C.V.O., on "The Past and Future of the Royal Indian Marine," published in the JOURNAL for August, 1924, p. 465.

the wives had rigged a clothes line between two guns on which to dry the baby's clothes !

The four station ships were all very old. They were of about 1500 tons and their speeds varied from 9 to 13 knots ; the armament was four 3-pounders. Their duties were to act as station vessels in the various out-ports and to carry out duties of Governor's yacht and lighthouse tender. There was one at Rangoon for the Governor of Burma and Burma Lights ; one at Port Blair for general duties under the Chief Commissioner of the Andaman Islands ; one at Aden for Southern Red Sea Lights ; and one in the Persian Gulf to tend the Persian Gulf Lights and for duty with the Political Resident, Persian Gulf.

At this time the Service was constituted under the Marine Acts of 1884 and 1887, which provided for the taking over of ships and personnel by the Admiralty in cases of emergency, and the Indian Marine ships were constructed with a view to their becoming auxiliaries in time of war. In fact the policy of the Indian Government was to maintain the Royal Indian Marine as a part of India's contribution towards Imperial Defence.

All the ships were taken over by the Admiralty on the outbreak of war, and naval officers were appointed in command ; the key men were also supplied by the Royal Navy. In the troopships, in addition to a First Lieutenant of the Royal Navy, there was a Royal Indian Marine First Lieutenant, who ran the Indian crew. This did not prove to be a very satisfactory arrangement.

During the War 60 per cent. of the officers and all the crews of the R.I.M. were serving under the White Ensign ; 30 per cent. accompanied the various expeditionary forces, whilst the remainder were at the Indian ports supervizing the fitting out of transports, routeing and port administration generally. It is an interesting fact that the only theatres of war in which R.I.M. officers were not represented were North Russia, the Cameroons and Tsingtau.

After the German raider "Wolf" had laid her mines off Bombay in 1917, India ordered eight trawlers to be built ; but these were not completed until after the War, when they were utilized for towing the various river craft from Mesopotamia back to Calcutta and Rangoon, from which ports they were borrowed. Four of these trawlers were built in the Royal Indian Marine dockyard, Bombay, and four by John Burns in Calcutta. The Bombay built ships were composite and copper sheathed, the Calcutta ones were of steel. Only two remain in service to-day ; one is used for towing targets and one as a water boat in Bombay.

After the War the Royal Indian Marine reverted to its duties in station vessels, trooping and surveying. The latter used to be a very popular Branch of the Service, especially for married officers, as it enabled them to have a proper home. The surveying ships went out to the survey ground at the beginning of October, and returned to Bombay at the end of April. Then the crew got their leave and the officers went to Coonoor, in the Nilgiris, to make their charts, so getting five months in the hills every year. The Surveying Service is not quite so popular to-day, as there is only one surveying ship and, unless an officer is well placed, he has to return to general service after about ten years' surveying in order to maintain a general level of officers of the right age. He naturally feels at a considerable disadvantage after being away from naval routine for so long.

In 1920 Rear-Admiral Mawby was appointed Director of the R.I.M. and charged with reorganizing the Service so that it could be to some extent responsible for the naval defence of India. In 1923 the Inchcape Committee was appointed. Amongst other things, they recommended the abolition of the R.I.M. troopships on the grounds that trooping could be done far better by ships taken up under contract from the Merchant Service. This was approved, and the Service was then left with only station ship duties and surveying.

Early in 1925 a departmental committee was convened by the Government of India, with the concurrence of the Secretary of State for India and the Admiralty, to draw up a scheme for the reconstruction of the Royal Indian Marine as a combatant force to enable India to enter upon the first stage of her own naval development and ultimately to undertake her own naval defence. The Committee consisted of General Lord Rawlinson, Commander-in-Chief in India; Rear-Admiral Richmond, C.-in-C., East Indies; Sir B. N. Mitra, Member of Council to the Governor-General in India; Mr. E. Burdon, Secretary to the Government of India Marine Department; and Captain E. Headlam, Director of the Royal Indian Marine.

This Committee drew up a scheme which eventually received the Royal approval. The chief features of it were that the Indian Navy should consist of: 4 sloops; 2 patrol boats; 8 minesweeping trawlers; and 2 surveying ships. All these ships we already had, although some were very old. The Service was to be commanded by a Rear-Admiral lent from the Royal Navy for a period of three years, his title to be Flag Officer Commanding, R.I.M. The most important role of the new force in its early stages would be that of a training squadron. The personnel was to be thoroughly trained in gunnery, minesweeping, harbour defence, etc.

In peace-time the functions of India's Navy would be :—

- (a) Training of personnel for service in war.
- (b) The services required by the Government of India in the Indian Ocean and Persian Gulf.
- (c) The organization of naval defences at ports under the control of the Government of India.
- (d) Surveying in the Indian Ocean.
- (e) Sea transport work for the Government of India.

The Committee recommended that the Service should be called the Royal Indian Navy and fly the White Ensign.

At the end of 1926 things began to move. All the station-ship duties were taken over by the various local governments and the ships were concentrated at Bombay. Two officers were lent from the Royal Navy to start instruction and to advise on the militarization of the ships, and they arrived in Bombay at the beginning of 1927 with a big job in front of them. Except for a few officers who had done service during the War with the Royal Navy and odd courses in England before joining the Service, the Service was completely untrained. All the ships were put into dock in turn in Bombay, armed with 4-in. guns, and fitted for minesweeping, so that by the end of 1928, when Rear-Admiral H. T. Walwyn came out to India, a definite start had been made.

With the reorganization of the Service in 1928 the Indian Naval Discipline Act was introduced into the Legislative Assembly. Its aim was to change the designation of the Service from Royal Indian Marine to Royal Indian Navy; but this Bill was defeated in the Assembly by one vote. It was reintroduced again in 1934, however, and then passed by a good majority.

During the time Admiral Walwyn commanded the Service from 1928-34 he made considerable improvements culminating with the change of title to Royal Indian Navy. Soon after he arrived he decided that the uniform then worn by the ratings was not in keeping with the Navy: it consisted of blue jean, baggy trousers and a long flowing smock with a stocking cap similar to that worn by lascars in the Merchant Service. In due course Royal permission was granted for the ratings to wear the same uniform as is worn in the Royal Navy, except for a distinctive button. This change was very much appreciated by the men. The Indian sailor loves dressing up and showing himself off, and he always does the Service great credit on ceremonial parades.

Admiral Walwyn's next effort was to get the officers a proper mess on shore in which those on the staff and from ships refitting in Bombay might live. This was approved and started, luckily, just before the depression in 1931.

In 1930, a new ship, the "Hindustan," was built. She is a sloop of the "Bridgewater" class, but 30 feet longer in order to accommodate Warrant Officers and to give extra space for mess decks, etc., as all her service will be spent in the tropics. Next came the replacement of the surveying ship "Investigator." Her successor was the "Patrick Stewart," a cable ship, bought from the Indian Government Telegraphs. She was converted for her new duties in the R.I.N. dockyard in Bombay. Another sloop, the "Indus" (which came home to attend the Coronation Review), was ordered at that time, but did not arrive in India until 1935.

At the end of 1934, Vice-Admiral Sir H. T. Walwyn was relieved by Rear-Admiral A. E. F. Bedford, who has since been doing his utmost to get the Service enlarged and on a sounder basis. Shortly after his arrival the King's Colour was presented to the Service by Lord Brabourne, Governor of Bombay, in December, 1936. Another mark of official esteem was a rise of pay and the introduction of marriage allowance. Pensions are also under revision.

In 1928 three phases were laid down for the Naval Defence of India:—

- (1) Local naval defence.
- (2) Off-shore patrols and minesweeping, etc.
- (3) Building up a squadron to be at the disposal of the Admiralty in time of war.

The Budget for all the fighting Services in India comes under the heading of Defence and is controlled by the Defence Minister, who is the Commander-in-Chief. Owing to financial stringency and the Indian General Staff's preoccupation on N.W. Frontier problems, the first two phases of the naval defence have not made much headway, and the minesweeping trawlers have become obsolete. The questions of a Royal Indian Naval Reserve and a Royal Indian Naval Volunteer Reserve have been before the Government for years, but these Services have not yet materialized. As regards officers, a scheme would not take long to get under way; there are plenty of volunteers on the waiting list, both European and Indian.

An annual subsidy of £100,000 is paid from the Royal Indian Navy Budget to the Imperial Treasury towards Naval Defence plus £32,000 for fuel allowance of Persian Gulf sloops and certain of their refits. This sum may seem very insignificant, but when it has to come out of a Budget totaling only about £500,000 a year it assumes very large proportions. Money for new construction does not have to come out of the Budget but is a separate special vote. The next ship to be replaced is the "Cornwallis," a "Flower" class sloop built in 1917, and called then the "Lychnis."

Unless one has a knowledge of the conditions which prevail in India, it is not possible to appreciate the difficulties under which the Flag Officer Commanding, living in Bombay, has to work in carrying out the duties of an Admiralty eight hundred miles away from the seat of Government with no representative at Defence Headquarters—there used to be a Lieutenant-Commander there, but the appointment has now been done away with.

Now to deal briefly with the question of personnel. The Executive Officers consist of the Flag Officer Commanding, lent from the Royal Navy; four Captains; eleven Commanders; and forty-eight Lieutenant-Commanders, Lieutenants, and Sub-Lieutenants—a total of sixty-three. The normal method of entry of all Executive Officers into the Service is by the Special Entry system from Public Schools, and also from the Mercantile Marine Training Establishments. Entrance examinations are held in India and England simultaneously. The Service is in the process of Indianization, the ratio being one Indian in every three Cadets. The Cadets, whether Indian or European, after entry are sent to England to join up with the Royal Navy Special Entry class. They remain in England until they become Acting Sub-Lieutenants when they come out to India and are sent to a ship.

There are already five Indian commissioned officers in the Executive Branch, with one or two more Cadets in England under training. The senior Indian officer has, at the moment, only one year's service as a Lieutenant, so it is very difficult to foretell exactly how they will turn out. As junior officers, they are very keen and good at games, and, in fact, compare very favourably with their European contemporaries. Reports from H.M.S. "Frobisher" of their initial training have also been most encouraging.

Gunners and Warrant Telegraphists are either transferred permanently from the Royal Navy or are sent out on loan for five years. These men are usually Petty Officers passed for Warrant Officers, who get Warrant ranks when they come to India so as to give them a proper status with the Indian seamen. Boatswains are promoted from the Lower Deck.

Medical Officers are either lent from the Indian Medical Department or the Royal Army Medical Corps. We have an I.M.D. Sub-Assistant Surgeon (a Warrant Officer) in each ship, with one R.A.M.C. Major at Headquarters in Bombay as P.M.O.

Each ship runs her own accounts; these are kept by a Warrant Writer under the supervision of the Executive Officer. In Bombay, at Headquarters, the accounts are run by personnel lent by the Indian Military Accounts Department. This branch is completely Indianized,

except the one Paymaster-Commander lent from the Royal Navy as Admiral's Secretary.

There are a large number of Engineer officers on the Active List, of whom two or three are in each ship, and about five in Bombay Dockyard, also two or three in each of the major ports as Surveyors. The reason why there are so many engineers in the ships is that they are there for training, and because there are no Engine Room Artificers. These officers also run the electrical department. There is a scheme on foot to train E.R.As., but it will take some years before it is in working order. The Engineer Branch is being Indianized in the same way as the Executive one. The method of entry is that candidates are sent to Royal or Mercantile Dockyards in England to do their five years apprenticeship. On completion of this, they came before a Selection Board; successful candidates are given a Divisional or Electrical Course at Portsmouth, then go out to India as Engineer Sub-Lieutenants.

The ratings are all Mussulmen. This obviates any religious questions which might arise where there are Hindus, etc., as in the Indian Army. The principal recruiting ground is in the Punjab and N.W. Frontier Provinces, from which district about 75 per cent. of the men are obtained, the remaining 25 per cent. coming from the Konkan coast, about 250 miles South of Bombay. It may appear strange that the Navy should go so far afield for recruits, especially when it is realized that the Punjabis live a thousand miles from the sea. On the other hand they are some of the finest fighting material in India; they are of fine physique, intelligent and, above all, keen and loyal to the core.

The method of recruiting is to warn the Army recruiting officers in the various districts that a naval recruiting party will be visiting their district on a certain date.¹ These officers promulgate the information that a naval party is about to arrive, with the result that hundreds of boys turn up in each district. Actually only about 2 per cent. of those who volunteer are taken. The procedure is sometimes rather amusing: the boys are fallen in in a long line, the Recruiting Officer and Medical Officer walk down the line rejecting about 50 per cent. of the applicants out of hand. On one occasion, the officer thought the line was rather long and found that, as the boys were rejected and told to fall out and go home, they crept along to the end of the line and fell in again. To get over this difficulty the Medical Officer stamped the eligibles on their backs with a rubber stamp; but even this was no good, as the boys managed to transfer the still wet ink from one back to another with the palms of their hands!

¹ The Army have permanent recruiting officers stationed all over northern India who give every assistance.

At present only about a hundred and twenty recruits a year are taken, so it is possible to set a very high standard. This number is regulated by the size of the training establishment in Bombay, which is normally three terms of forty boys in each term. There is a common entry for all ratings, boys selecting their branches after six months' general training. For the next eighteen months they specialize in whichever branch they select, after which they do six months sea-time before being examined for ordinary seamen. The reason for this common entry is due to the lack of seafaring tradition in the Northern Provinces, but it is hoped that in future this will be overcome. Up to a point it is very convenient to have a common entry, as all branches have been filled without difficulty.

The Training Establishment includes Gunnery, Signal, Stoker, P/T and Mechanician Schools. The whole training is, at present, carried out in Bombay, and the accommodation is very cramped; but last year a plot of land was acquired at Karachi, where it is proposed to open up a Boys' Training Establishment. This will make an ideal training ground. The rainfall in Karachi is only about 3 inches a year, and the climate good. It will, however, be at least another two years before the Establishment is in running order. It will eventually be large enough to hold five hundred boys.

The standard of efficiency of the ratings of the Service is as a whole good, and they appear to be able to hold their own with their opposite numbers in the Royal Navy of the East Indies Squadron. They certainly do not lack keenness. The Communications Branch is particularly efficient. When Lord Jellicoe was on his world cruise in 1919 he was so impressed with the R.I.M. signalmen that he took twelve of them to Australia in his flagship, H.M.S. "New Zealand."

On the outbreak of war the Admiralty would require a number of auxiliary craft to be taken up in India; but there is nothing in those waters which corresponds with the North Sea trawling fraternity; hence it is essential that when these auxiliary craft are taken up they should be manned entirely by fleet reservists and officered by Reserve or Volunteer Reserve Officers. A large number of signal ratings will also be required.

Bombay is the headquarters of the Royal Indian Navy, and here are all the Administrative Offices and Training Establishments previously mentioned, also a dockyard which is capable of refitting and docking "D" class cruisers and below. There are two dry docks. The old Bombay dock was built in 1763, and is in three sections. Last year one of the sectional gates was removed so as to enable a modern destroyer to be docked. The other dock is the Duncan Dock (700 feet by 63 feet), which was built in 1810.

The Royal Indian Navy at present consists of five sloops: the "Clive" (flagship); "Lawrence"; "Hindustan"; "Indus"; and the "Cornwallis." These are all armed with two 4-in. guns, except the "Indus," which has two 4.7-in.

The annual programme of the Squadron is generally as follows: November to April, cruising round the coast of India and in the Mergui Archipelago; from May to October, which is more or less the monsoon season, the annual training is carried out. The Squadron is generally based on Trincomali and Karachi; it then makes the trip from Trincomali to Karachi in the height of the monsoon as an endurance cruise—a most unpleasant business in a small ship.

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CROSSING THE NAHAKKI PASS



**WUCHA JAWAR CAMP IN THE LEFT BACKGROUND
THE TANK ON THE N.W. FRONTIER**

*From photographs supplied by Lieut.-Colonel J. H. Darwell, O.B.E., M.C.,
Royal Tank Corps*

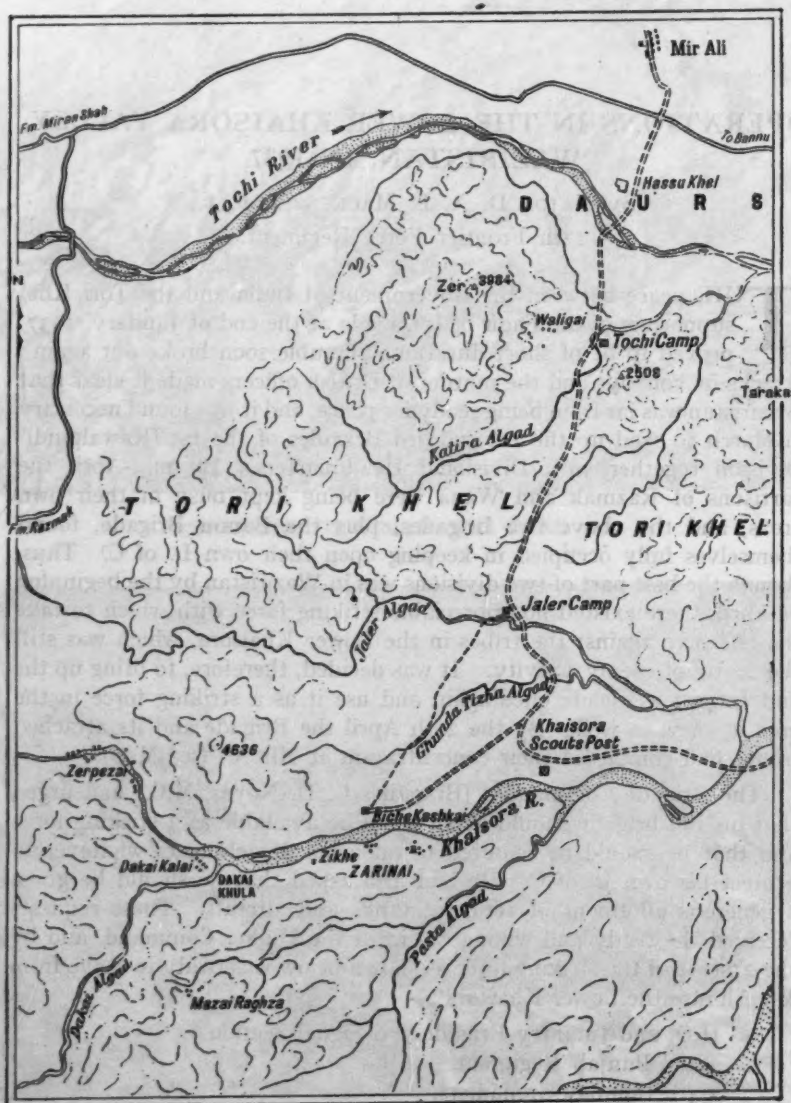
OPERATIONS IN THE LOWER KHAISORA VALLEY, WAZIRISTAN, IN 1937

By MAJOR D. A. L. MACKENZIE, *p.s.c.*,
12th Frontier Force Regiment.

THE peace between the Government of India and the Tori Khel supporters of the Faqir of Ipi, made at the end of January, 1937, proved to be of short duration. Trouble soon broke out again; attacks on convoys and the murder of British officers made it clear that Waziristan was far from being ready for peace, and it was found necessary in March to send up the 1st and 3rd Brigades of the 1st (Rawalpindi) Division together with Divisional Headquarters. By mid-April the garrisons of Razmak and Wana were being kept busy in their own areas, and the above two brigades, plus the Bannu Brigade, found themselves fully occupied in keeping open their own L. of C. Thus, though the best part of two divisions was in Waziristan by the beginning of April, there existed no appreciable striking force with which to take the offensive against the tribes in the Lower Khaisora, which was still the centre of enemy activity. It was decided, therefore, to bring up the 2nd Infantry Brigade once again and use it as a striking force in the area it knew so well. By the 20th April the Brigade and its attached troops had completed their concentration at Mir Ali (see Map).

The Brigade Commander (Brigadier C. D. Noyes, M.C.) had urged that his full brigade should at all times be available as a striking force and that he should be required to make no detachments whatever to protect his own L. of C. He had also asked that he should be given a generous allotment of artillery, tanks and aircraft. These requests received the ready and willing assent of the Higher Command, and by the 21st April the striking force as shown below was ready to move from Mir Ali into the Lower Khaisora :—

H.Q. 2nd Infantry Brigade and Signal Section.
2/2nd Punjab Regiment.
2/4th Bombay Grenadiers.
2/8th Punjab Regiment.
1/11th Sikh Regiment.
H.Q. 23rd Mountain Brigade, R.A.
3rd, 8th and 15th Mountain Batteries, R.A.



Scale 1 inch = 3 miles (approx.)

66th Field Battery, R.A. (Mechanized).

2nd Field Company, Bengal Sappers and Miners.

9th Light Tank Company, R.T.C.

Detachments 32nd and 33rd Animal Transport Companies (Mule),
R.I.A.S.C.

39th Animal Transport Company (Mule), R.I.A.S.C.

No. 4 Field Ambulance.

Detachment No. 3 Sanitary Section ; and

No. 20 Royal Air Force (Army Cooperation) Squadron.

In addition to the above a composite brigade, formed chiefly from the 3rd (Jhelum) Infantry Brigade and partly from the Bannu Brigade, was concentrated at Mir Ali with the object of going forward with the striking force and taking over the protection of its L. of C. and camp piquets.

THE OBJECT

The ostensible object of the striking force was to move into the Lower Khaisora and re-provision the Scouts Post which had been established there in January (see Map). Its real object, however, was to bring the enemy to battle and inflict upon him the maximum losses at every opportunity. The force was to establish itself at Jaler Camp, from which it was not to advance further than a day's circuit of action. This limitation was, however, removed when, as will be seen later, the advance on Jaler did not have the effect of bringing the enemy to battle as had been anticipated by the political sources of intelligence. The Political Officer, North Waziristan, attended a conference at Divisional Headquarters on the 18th April and expressed the opinion that the force would probably be opposed on the South bank of the Tochi river by small parties from Zer. As the force advanced southwards towards Tochi Camp the strength of the opposition would be increased by collections of tribesmen from both Zer and Tarakai and, finally, that a maximum of from 1500 to 2000 tribesmen would oppose the advance from Tochi Camp to Jaler. The first part of the advance was over the three miles of level country between Mir Ali and the South bank of the Tochi river, covered at the time with standing crops to a height of some three or four feet. Dotted here and there are numerous small villages, isolated houses and towers—all potential snipers' posts, although the inhabitants were reported to be friendly. The hills are not difficult and are free from scrub, but many large boulders and outcrops of broken rocks on the lower slopes of Zer and on the foothills leading into the Katira Algad, South of Zer, afforded ideal cover and an easy get-away up the Katira for an enemy.

THE PLAN

The 1st Divisional plan for the advance from Mir Ali to Tochi Camp on the 23rd April was, briefly, that the road through the intricate Daur country up to and inclusive of the South bank of the Tochi should be opened by the 3rd Brigade, who were also to secure a bridgehead across the river to enable the 2nd Brigade to pass through and secure the old Tochi Camp. Both brigades, less one battalion of the 3rd Brigade which was to garrison Mir Ali, would stop the night at Tochi Camp. The 2nd Brigade was to construct and wire the camp piquets, which would be garrisoned by the 3rd Brigade, and so enable the striking force to get a night's rest in preparation for the battle which was expected on the next day. The defences of Tochi perimeter camp were known to be fairly intact. The object being to bring the enemy to battle, there was no great point in trying to deceive him as to our projected line of advance. What was most important, however, was that the enemy should be given no opportunity of anticipating the time at which the force would be crossing the cultivated country North of the Tochi. Parties of snipers posted in this area might do a lot of damage and cause much delay. Any movement into this area was, therefore, strictly forbidden and reconnaissances had to be carried out from distant viewpoints on the flanks. Once across the Tochi the force would have room for deployment and for the full use of its fire power. The greater the enemy strength South of the river the better chance there would be of inflicting severe losses on him. This country also was suitable for the use of light tanks, but, since their too early appearance might cause the enemy to disperse prematurely, for the tribesmen have a wholesome fear of the tank, Brigadier Noyes decided to keep them hidden in the bed of the Tochi river in the first instance.

After crossing the Tochi the first objective must be the lower slopes of Zer, for these slopes lay on the flank of the advance, and it would be dangerous to advance beyond them until they had been secured. Nor was it feasible to attack both Zer and the old Tochi camp site simultaneously, for to do so would have meant an undue dispersion of the available artillery supporting fire. With these considerations in mind, the Commander planned his attack.

Owing to the fact that many of the units of the brigade, particularly the gunners and tanks, had not previously worked together it was decided to hold a rehearsal of the operation beforehand. Most fortunately, an area of ground to the East of Mir Ali was found to possess in many respects features in miniature resembling those over which the actual advance was to take place, and on this an attack was staged two days before the real operation. There is no doubt that this rehearsal

contributed largely to the success at small cost of the first day's engagement.

THE ADVANCE

The operations commenced on the 23rd April, and on that morning the 3rd Brigade marched out of Mir Ali at about 4.45 a.m., and the 2nd Brigade closely followed behind them. A small delay occurred near a village just North of the Tochi river, where a culvert had been destroyed, rendering the road temporarily unfit for motor vehicles, particularly for the mechanized battery, but the damage was quickly repaired by the 4th Field Company, Sappers and Miners, and the advanced guard of the 3rd Infantry Brigade reached the South bank of the Tochi river by 7.15 a.m., sustaining only one casualty by fire from a village on the South bank. By 8.10 a.m. the bridgehead had been secured, and at 8.30 a.m. the 2/4th Bombay Grenadiers, supported by all four batteries, passed through the 3rd Infantry Brigade line to the attack on their first objective (on Zer). The attack was on a two-company front and went forward with great speed until some low features under the ridge were reached. Here the advance sustained some casualties and was temporarily held up in an exposed position. The battalion commander, however, soon took stock of the situation and sent his reserve company round and up the left edge of the spur, personally leading his men to the top, which was reached by 9.35 a.m. Realizing that it would take some time for the 2/4th Bombay Grenadiers to reorganize for the attack on their second objective, the Brigade Commander decided to send the 1/11th Sikh Regiment forward for the capture of the latter and bring the Bombay Grenadiers into reserve as soon as relieved by a company of the 2nd Battalion The Argyll and Sutherland Highlanders from the 3rd Brigade. By 9.45 a.m. the Sikhs were launched, and at 10.7 a.m. had captured the second objective without opposition. A few minutes before the Sikhs started, the 9th Light Tank Company rushed through at great speed and were in position beyond their objectives before the Sikhs had got on to the second objective. The guns which had been busily engaged keeping down the fire on the Bombay Grenadiers' right flank had now to be switched on to the third objective, i.e., the Tochi Camp site and Pt. 2508. At 10.45 a.m. the 2/8th Punjab Regiment commenced their attack on this objective and, with the exception of some sniping from their left flank, met with no opposition and had secured their objectives by 11.7 a.m.

LAYING OUT A CAMP

A period of intense hard work now commenced. As always in Frontier warfare, the day's work is only half done when the march is

over and the camp is reached. From previous knowledge of the site, it had been possible beforehand to estimate the number of camp piquets required and to prepare a rough sketch showing the probable allotment of areas and piquets to units. In addition, two lists had been worked out, one showing the exact details of all parties required for construction and wiring of the piquets, the other showing the parties required to unload and stack the contents of the big lorry convoy which was awaiting the signal to start from Mir Ali. The 1/11th Sikh Regiment and the 2/8th Punjab Regiment being now in position to cover all work, the reserve battalions were called into camp. The 2/2nd Punjab Regiment were given the construction of the camp piquets as their task while the 2/4th Bombay Grenadiers were to deal with the lorry convoy. The latter had by now been ordered forward, and on its arrival the working parties were awaiting it. Meanwhile the Brigade Commander had reconnoitred the proposed camp piquet positions and decided on their actual sites, and their construction was immediately taken in hand by the 2/2nd Punjab Regiment.

Now came the difficult job of the Staff Captains. Tochi Camp is probably the worst site, from the point of view of laying out a camp, in Waziristan, the ground being a series of ups and downs and the shape of the perimeter quite indescribable. A divisional and two brigade headquarters, seven battalions, four batteries, two companies of sappers and miners, a company of tanks, two field ambulances, mule transport companies and various supply and ordnance dumps—all had to be fitted in very rapidly. Further, the unloading, distribution and turn round of some 200 lorries in such confined space was no mean task, but by 3.30 p.m. the convoy was on its way back to Mir Ali. As soon as the lorries were through the withdrawal to camp began. One battalion of the 3rd Brigade was to return to Mir Ali to garrison that centre and open the road to the Tochi next day, while the rest of the force was to withdraw to Tochi Camp. Although there were some anxious moments in getting first the Argylls and then the Sikhs away from their exposed positions, the enemy did not follow them up and all troops were safely in camp by 7 p.m.

After a long and arduous day, nearly everyone having been up several hours before dawn, the troops had every reason to feel satisfied with their labours. The universal regret, however, was that the enemy had not thought fit to make a real fight for it. In the attack on Zer spur the enemy had a good get-away behind the massive rocks on the main feature, and by escaping in this direction avoided getting too close to the 9th Light Tank Company, who, much to their disgust, had no opportunity of engaging the enemy. The artillery, however, had some

good targets during this period, and there is no doubt that the excellent support given to the Bombay Grenadiers by the 23rd Mountain Brigade on this flank was the chief reason for the former's small casualties, all of which were quickly evacuated to Mir Ali, and some of which reached Bannu the same day. Night came down on a somewhat tired soldiery and few lights were burning after 8.30 p.m., save in the various staff tents, where orders were being written for the operation the next day to confirm those given out at the conferences held earlier in the evening.

On the following day, in spite of the predictions of the political authorities that there would be a stiff fight in the neighbourhood of Jaler Camp, the advance was unopposed and everything went "according to plan." The troops were all in camp and piquets established by 5.15 p.m.

On the 25th April, the 2nd Brigade was ordered to advance to the Scouts Post on the Khaisora and cover the replenishment of that post with water and food. Troops of the 3rd Brigade opened the road from Mir Ali and the 1/11th Sikh Regiment were left to protect Jaler Camp. Once again no opposition was met, and by 9.40 a.m. the Brigade was in position covering the post and the water and supply convoy was ordered through. The Brigade Commander with a small escort now crossed the Khaisora and climbed to a point from which he could reconnoitre the Pasta Algad. By 2 p.m., thanks to the skilful arrangements of the Officer Commanding, No. 2 Field Company, Bengal Sappers and Miners, 16,000 gallons of water had been put into the post and the withdrawal to Jaler Camp began. A few parties of the enemy were seen and engaged by 9th Light Tank Company and by one of the piquets, but all were back in camp by 3.45 p.m.

Although the first object of the operations, namely the reprovisioning of the Scouts Post, had been achieved, no opportunity had yet occurred of bringing the enemy to battle. It will be remembered that the original plan had envisaged no operation being carried out beyond one day's circuit of action from Jaler Camp, but it was now becoming obvious that the tribesmen would not oppose us in strength in that locality. The only way to bring on a battle was to go and seek them in the area, which we could be moderately certain they would fight to defend, their strongholds at the junction of the Dakai Algad and the Khaisora. This meant a move forward of the striking force to a camp at Biche Kashkai, from which it could operate towards Dakai Khula and the Dakai Algad. The Commander, 1st Division, decided therefore that the striking force should move to Biche Kashkai on the 27th April, after the troops had had an opportunity to rest and wash and the necessary preparations had been made for a further advance. He also

decided, in pursuance of the policy of keeping the 2nd Brigade intact as a striking force, that the 1/17th Dogra Regiment should move up from Tochi Camp and join the 2nd Brigade at Biche Kashkai for camp defence duties. The 2nd Light Battery was also ordered to replace the 66th Field Battery in the striking force, since operations from Biche Kashkai would be over ground quite unsuitable for lorry-drawn artillery.

AT BICHE KASHKAI

On the morning of the 26th, therefore, a reconnaissance towards Biche Kashkai was made by the Commanders, 1st Division and 2nd Infantry Brigade, escorted by the 1/11th Sikh Regiment. No opposition was met and the party returned to camp by 12.15 a.m. The Brigadier, having now come to the conclusion that an advance up the Khaisora river bed to Dakai Khula, while probably bringing on the desired battle, would do so on ground particularly favourable to the enemy, decided, with the concurrence of the Commander, 1st Division, to make his attack on the hills to the South of the river towards Mazai Raghza overlooking the hostile stronghold at Dakai Khula. By doing this he would force the enemy to leave the cover of the bushes and rocks which exist on the hills up the Khaisora Valley, and come out into the more open country on the tops of the hills, where they would present favourable targets for the R.A.F., artillery and machine gunners. It was essential for the success of this plan that the enemy should be made to think that the Brigade would advance up the Khaisora as it had done on the 22nd December, 1936. The first step towards deceiving the enemy was to cause the Political Agent, North Waziristan, to have inquiries made, not too discreetly, regarding the amount of water available at Zerpezai.

Early on 27th April the striking force left Jaler Camp for what were to be an exciting and adventurous four days. By 10.40 a.m. Biche Kashkai camp site had been secured, the covering troops were in position and the work of constructing camp piquets and building up the perimeter walls begun. Two of the camp piquets were in exposed positions, and as an added safeguard for these an extra apron of wire was put up. As there were persistent rumours of intended night attacks on unwired camps, particular care was taken in siting the perimeter defences, automatic weapons being very carefully sited and well dug in. At about 11.35 a.m. the Brigade Commander crossed to the South bank to a suitable observation post to make his plan for the next day's operations, and at 2.30 p.m. issued from this spot his orders for the attack on the Mazai Raghza position. During this time the Commander's pennant was being prominently displayed by the 2/4th Bombay Grenadiers from their headquarters on a prominent spur on the North bank of the river

with the object of further misleading the enemy as to the true direction of the morrow's attack. All troops withdrew to camp by 4.30 p.m. Throughout the day large numbers of the enemy had been seen at a distance and in many small bodies on both banks of the Khaisora, and it became increasingly obvious that our object of bringing the enemy to battle would be attained on the morrow. But it was not to be so, at any rate next day.

A NIGHT ATTACK

Very soon after the withdrawal of the covering troops at about 5.15 p.m., the camp piquets on the West of the camp began to come under heavy fire from a ridge running parallel to and about 400 yards from their position. Several bodies of the enemy were seen on this ridge and engaged by artillery from camp until darkness set in. Sniping continued after dark and some casualties occurred in the camp, particularly amongst mules. At about 8 p.m. it was obvious that No. 2 Piquet was being heavily attacked and, on an "S O S" signal from that Piquet, two rounds of gun-fire were put down on a previously recorded target beyond it. This had the effect of heartening the garrison, who reported that one shell had fallen very near the spot whence the enemy were firing. Two more attempts on this piquet were made, the enemy reaching the wire and throwing bombs into the piquet before they were driven off. They then turned their attention to No. 1 Piquet and made several similar attacks on it throughout the night, again using bombs. Attacks were also made on two other piquets. Meanwhile the sniping of the camp had been going on continuously until, at about 10 p.m., it suddenly increased in volume coinciding with shouting from the South-West. A three-quarter moon was now rising, and at 10.30 p.m. tribesmen were seen at the top of the river bank to the South-West about fifty yards from the perimeter, and a few minutes later they were also seen on the western face of the perimeter. The camp had, of course, "stood to," and, with the aid of illumination provided by Verey lights, machine-gun and rifle fire was opened with effect. From an aeroplane the pyrotechnic display must have been most impressive could one have been in the air at that moment. As it was the experience was most hair-raising. It was apparent that the enemy was providing covering fire from the river bank to his real attack, which was approaching along a small nullah and a graveyard leading to the West face of the camp. In this locality the enemy made an attempt to rush the gate but were driven off by fire. They at one time were as near as twenty yards from the wall, and two officers had the chance of revolver practice on them. Foiled on this side, the enemy moved round to the North face of the camp and attempted to creep

up to the perimeter posts on the ridge overlooking the camp here, but were once again repulsed by fire. They then withdrew, and for some time quiet reigned until they were again seen in small parties at various spots round the camp. It is possible that on this occasion they had returned to collect their dead and wounded, for several cries were heard from men obviously wounded and directing their rescuers. Shortly after 11.30 p.m. attacks on the piquets recommenced and, about this time, all communication with two piquets was lost and no firing from them could be heard or seen. Attacks on the piquets went on till 3.30 a.m. Thus, except for the clearing up next morning, ended an experience which in all recent history of Frontier warfare is probably unique. Piquets and isolated detachments have frequently been attacked at night, and will probably continue to be on future occasions so long as the tribesman is what he is ; but never before has an attack on so large a scale been made on a strongly defended camp bristling with automatic weapons and manned by some 3000 men. One cannot believe that it is ever likely to happen again. One feature of the battle which struck all was the demeanour of the animals. With all the noise, the lights, the firing and the casualties among them, the animals were most strangely quiet, all standing perfectly still with scarcely a movement.

Such an attack can only have been inspired by fanaticism. Blind faith of the tribesmen in the powers of the Faqir of Ipi as announced by himself, such as his ability to turn aeroplane bombs into bundles of paper, his statement that his followers need not worry about getting killed as he intended to raise them from the dead as soon as he thought fit, and that it was only by getting killed in his cause that they could prove themselves to be true followers of Islam. It might be thought that this novel and at times terrifying experience would have damped somewhat the ardour of the troops. Not a bit of it. During the fight, while moving up to their positions and while engaging the enemy, they were full of enthusiasm, and there can be no doubt that in repulsing this attack with so little loss to themselves they received a moral fillip which set the seal on the feeling of confidence which had imbued all ranks from the outset of the operation.

At about midnight, when touch with two of the piquets had been lost and no sound from them could be heard, the Brigade Commander had to make up his mind whether the attack, which was timed to start at 5.30 a.m. next morning, should take place or not. Loath as he was to be diverted from his purpose, the following reasons influenced him in deciding to ask for a twenty-four hours' postponement of his attack :—

- (a) The battle was not over.
- (b) The security of the camp was not assured, all touch having been lost with two of the camp piquets.
- (c) The troops had been up all night and would by no means be fresh for the arduous work which would be expected of them on the morrow.
- (d) Some twenty-five mules and chargers had been killed or wounded, entailing a redistribution of animals, which, though a slight task in itself, would have to be carried out in the dark if the attack were to go forward at the advertised time, and it was essential that this time should not be altered.
- (e) Ammunition had to be replaced and belts refilled.
- (f) The battle-field required to be cleared, casualties evacuated from the piquets and their garrisons changed in most cases.

The Divisional Commander agreed with these cogent reasons for the postponement of the attack, and arrangements were accordingly made for covering parties to go out at first light beyond the camp piquet line, for the relief of the garrisons of the piquets by other units, and for the clearance of the battle-field. Of the garrison of fourteen in No. 1 Piquet, nine were wounded, including the commander and second-in-command ; in No. 2 Piquet one man was killed and five wounded, and in No. 3 one man was wounded. From the blood marks around these piquets and the knives found it was evident that the piquet garrisons had inflicted a number of casualties on the enemy and had thoroughly earned the admiration of the camp for the fine fight they had put up. Three Indian Distinguished Service Medals were awarded the 1/17th Dogra Regiment as immediate awards to members of these piquet garrisons. The enemy succeeded in getting away all their dead during the night, though there were many evidences of casualties over the area of the battle. It has been impossible to ascertain the enemy's losses on this night as distinct from those they suffered two days later, but the real effect on the enemy is to be measured in loss of morale rather than loss of men, and the reverse suffered by them undoubtedly led to loss of confidence in the omnipotence of the Faqir of Ipi.

MAZAI RAGHZA

After the covering troops had taken up their positions on the early morning of the 28th April, large numbers of the enemy were seen on both banks of the river. They were, however, careful to keep at a distance ; nevertheless aircraft and artillery engaged them effectively throughout the day. At about 9 a.m. the Divisional Commander visited the camp and discussed the situation with the Brigade Commander. There seemed no doubt at this time that the enemy were collecting in

increasing numbers, that there was a good chance of bringing them to battle, and that the objective was of little importance provided severe punishment could be inflicted. It was consequently decided that the objective for the next day should be a large rounded hill feature South of the Khaisora river, and that, if it were possible, a further advance should be made up the ridge running West and South-West towards Mazai Raghza. The Brigade Commander was told that information was urgently required as to the amount of water in that village, but he was doubtful if he had sufficient troops to reach this distant objective. At about 2.30 p.m. the Brigade Commander issued his orders for the morrow's attack to all subordinate commanders from a point on the ridge immediately North of camp. During the evening the camp was again sniped, but to a very modified extent.

The object of the operation on the 29th April was to bring on a fight *on ground of our own choosing*. By attacking the enemy in the rocks and bushes of the Khaisora Valley the advance would attract few visible targets for the R.A.F. and gunners. But by getting on to the hills overlooking and East of the Dakai Algad, the stronghold to which the enemy attached so much importance would be threatened, and he would be forced to fight in more open though very hilly country.

Feint Attack.—1/17th Dogra Regiment with the 2nd Light Battery in support was to advance westwards near the river bed as ostentatiously as possible with the object of giving the impression that the force was about to advance up the Khaisora as it had done on the 22nd December, 1936. On arrival at a ridge about 1400 yards West of the camp, the Dogra Regiment were to establish a rifle company and a machine-gun platoon on it and withdraw the rest of their battalion to camp. The 2nd Light Battery took up a position immediately in rear of this ridge. The object of these dispositions was to bring fire to bear across the river on tribesmen moving towards the real attack when they realized that the Dogra Regiment's advance was only a blind.

Real Attack.—The 2/8th Punjab Regiment on the right and the 2/2nd Punjab Regiment on the left, leaving camp at 5.30 a.m., were to cross and go straight for the rocky outcrops on the South bank of the river. These two battalions were to drop piquets on the spurs up which they advanced for flank protection. On attaining their objectives, the 2/4th Bombay Grenadiers were to advance up the left spur through the 2/2nd Punjab Regiment and seize the top of the hill. The 1/11th Sikh Regiment were to advance up the centre to about half-way up and take up a defensive position there pending further orders.

Artillery.—One mountain battery was detailed to support each of the 2/2nd Punjab Regiment and the 2/8th Punjab Regiment on to

their respective objectives, one was kept in brigade reserve on the foothills to engage any targets missed by the other two, and the fourth, as has already been related, remained on the North bank in support of the 1/17th Dogra Regiment and ready to take in enfilade any enemy crossing the river to oppose the main attack.

Tanks.—The 9th Light Tank Company was to protect the left and exposed flank of the attack from the direction of the Pasta Algad.

Medical.—Stretcher platoons from the 4th Field Ambulance were to accompany each battalion, while arrangements were made in camp to organize emergency bearer parties from followers and odd men to assist in the long carry back to camp should it become necessary.

Exploitation.—Finally, at the conference it was explained that after the capture of the second objective the brigade would exploit towards Mazai Raghza.

A SUCCESSFUL ACTION

Troops left Biche Kashkai Camp at 5.30 a.m. on 29th April, that is, at first light, except the 1/17th Dogra Regiment, which left fifteen minutes earlier. As soon as the 2/2nd Punjab Regiment and the 2/8th Punjab Regiment were across the Khaisora and the batteries were in position, these battalions made straight for their objectives, which were captured with the greatest speed, both battalions being on them by 6.5 a.m., a remarkable performance. By 6.30 a.m. the Bombay Grenadiers had passed through the two Punjab battalions and were on top of the second objective with a large part of the battalion in hand. Closely following the Bombay Grenadiers, the Brigade Commander now ordered that battalion to swing to its right and push on South-West. Up to this time no enemy had been seen, probably because their attention was focused on the advance of the Dogra Regiment on the North bank, as had been hoped and planned for. When, however, the Bombay Grenadiers approached the summit some opposition was met, which was driven off with loss to the enemy. As the battalion moved up successive ridges of the spur towards Mazai Raghza, parties were left behind to hold these ridges and their flanks for the protection of the eventual withdrawal. Seeing that the whole of the Bombay Grenadiers would soon be used up, the Brigade Commander at 7.50 a.m. ordered the 1/11th Sikh Regiment to advance and pass through the Bombay Grenadiers along the narrow ridge along which runs a track to Mazai Raghza. This was done, the Sikhs moving quickly forward, dropping parties on each successive position along the spur. At 9.30 a.m. the Sikhs reached a position 1400 yards from Mazai Raghza, when the Commander reported that he had no troops left for a further advance. From this point excellent observation was obtained and Dakai Kalai

was shelled, much to the astonishment of the defenders. While the advance was in progress a number of messages were received telling of large parties of the enemy climbing the hills beneath. The feint of the Dogra Regiment was about to bear fruit. One party of 150 and another of 600 tribesmen were reported and engaged by aircraft and artillery. Other parties were engaged by the 2nd Light Battery and the machine guns of the Dogra Regiment from the North bank of the river. Good targets were also obtained by the flanking piquets left on the way up, and by the aircraft as the troops advanced and flushed the enemy.

As he was unable to go further through lack of troops, the Brigade Commander had to decide how long to remain on the position gained. It was obvious that the withdrawal would be energetically followed up, and, if he stayed too long, it would be very difficult to get casualties back to camp over such a long carry by hand in steep rocky country. On the other hand, to withdraw at once would mean that the movement up hill by the tribesmen, which the whole plan had aimed at bringing about, would not be sufficiently punished. The Brigade Commander therefore decided to wait for an hour and a half on the ground gained, during which time the maximum loss was to be inflicted on the enemy as they climbed the slopes towards the position. This, it is believed, was accomplished and the withdrawal was ordered to commence at 11 a.m. Even before this hour some parties of the enemy had succeeded in crawling up to concealed positions behind rocks close underneath the main ridge, whence they were able to inflict some casualties on our troops. The withdrawal was carried out according to plan and at great speed. The 1/11th Sikh Regiment withdrew through the Bombay Grenadiers, and the latter through the 2/2nd and 2/8th Punjab Regiments. The enemy followed up energetically and succeeded in inflicting some casualties, but the speed and precision of the withdrawal, combined with the very effective protection afforded by the flanking parties, close support aircraft and artillery prevented a larger casualty list. The work of the stretcher-bearers in getting the wounded off the hillside was beyond all praise. It had been anticipated that the 2/8th Punjab Regiment might have difficulty in withdrawing owing to the ease with which the enemy could approach over the foothills on their right flank. In order to help them off, one section of the 9th Light Tank Company was moved to a position on the low ground South of Zikhe to enable it to take in enfilade the reverse sides of the foothills. In spite of this, the rearmost elements of the 2/8th Punjab Regiment suffered some casualties, and the battalion commander was compelled to halt and put in a local counter-attack to recover two wounded men. This was skilfully accomplished with the support of No. 8 Mountain Battery and some machine guns of the 2/2nd Punjab Regiment.

By 1.30 p.m. all troops, except for one company and one machine-gun platoon of the Dogras on the North bank, had returned to camp; these troops, still on the ridge some 1400 yards West of the camp, were in a position of some difficulty, as a party of the enemy, reported to number 300, had reached some dead ground immediately beneath them, whence it was expected they would rush the ridge as soon as the withdrawal commenced. Accordingly the close support aircraft and the guns were put on to the target and another rifle company of the 1/17th Dogra Regiment was sent out to help their comrades to withdraw. As a protection for the camp, this withdrawal was not allowed to commence till 5.15 p.m., when it was successfully accomplished, and with only one casualty. There is little doubt that the action on this day succeeded in inflicting heavy casualties on the enemy. Pilots, artillery and machine gunners all reported excellent targets successfully engaged. Moreover, from this day forward the enemy were very rarely seen, and then only in small numbers. Sniping practically ceased and the troops were able to get some much needed sleep.

One of the most striking features of the day's work was the demeanour of the troops engaged. There was a spirit of exuberance prevalent which, in spite of the dangerous game to be played, would not be damped. There is no doubt that to get on top of the enemy gives one a great feeling of superiority over him both morally as well as physically, and one cannot but envy the R.A.F., who are permanently in this enjoyable position. Certainly the troops felt it on this occasion, and their anxiety to get to grips with him was most noteworthy. Our casualties during the day's operations amounted to twenty-one all told.

SUBSEQUENT OPERATIONS

On the 30th, the Brigade made a reconnaissance in force to the North-West of the camp. Meanwhile the Brigade Commander having attracted the enemy's attention in that direction, crossed to the South bank in a tank and, passing over the Zarinaï Ridge, moved down into the Pasta Algad, reconnoitring a line of advance for a road reconnaissance to be made the next day by R.E. officers. At the same time the 1/11th Sikh Regiment went out to gather in green crops with which to give our animals a well-merited increase of fodder. By midday the Brigade was back in camp. Some excitement was caused in the afternoon by the news that an aeroplane had crashed near the Khaisora Scouts' post. A section of the 9th Light Tank Company went off at once with an ambulance to rescue the airmen. This was successfully accomplished, and while cruising in the vicinity of the wreck one tank

met a party of enemy moving down the Khaisora river bed. Of this party of seven, three were killed and the remainder wounded.

Next day, the 1st May, the Brigade was ordered to return to Jaler via the Pasta Algad and the Scouts' post at Khaisora. En route an engineer reconnaissance was to be made for a road alignment along the Pasta Algad. This operation may sound simple, but in actual fact it was a most complicated business. It involved the evacuation of Biche Kashkai Camp, the unwiring of piquets, loading of the lorry column, evacuation of sick and a withdrawal in one direction by the lorry column, and in another direction by the striking force. At the same time, to avoid delay, the reconnaissance had to be got going in a very nasty piece of country. Both operations had of course to be fully protected by troops. However, all went well, the enemy kept at a respectful distance, and by 8 a.m. the "Camp Evacuation" detachment had joined the remainder of the Brigade on the South bank and had turned East towards Khaisora Scouts' Post. The rear parties of the Brigade reached the exit of the Pasta Algad about 11.30 a.m., being followed up by a few snipers only. On reaching the Scouts' Post the force found that all stores, etc., from the post had been evacuated, the local piquets were in the process of withdrawing, and that the post, which had only been built in January, 1937, was now a mere shell. The decision to abandon the Scouts' Post was undoubtedly a wise one. It served no useful purpose and locked up good troops in an area where not even the Tori Khel themselves will live in the hot weather. All troops, including the evacuated Scout garrison, were back in Jaler Camp by 1.30 p.m. A few shots were fired into camp during the night, two mules being killed.

On the 2nd May, apart from one battalion employed to open the road and a portion of another used as an escort for a reconnaissance by the Divisional and Brigade Commanders, the troops had an opportunity for a much-needed wash. On the 3rd May, all troops returned to Mir Ali, very little being seen of the enemy, though that intractable, the "Old Man of Zer," sped our departure with a few long-distance shots. It would appear that the objects for which the force went out were attained. The Scouts' Post was reprovisioned and eventually evacuated and abandoned. The enemy was brought to battle and severe losses inflicted on him.

The official enemy casualties during the period 23rd April to 3rd May are reliably estimated to have been : killed, 200 ; severely wounded, 157 ; other wounded (computed only and not authenticated) and prisoners, 246 ; Total, 603.

The casualties of the 2nd Infantry Brigade and attached troops

during the same period were : killed, 5 ; wounded (mostly light cases), 47 : Total, 52.

SOME LESSONS

The following points of interest came to light during these operations :—

Artillery.—The 3.7-in. mountain howitzer, as usual, proved invaluable. Of all the *ubiques* it is undoubtedly the most ubiquitous. One outstanding factor in this operation was the great effect of *shrapnel*. This type of shell is one with which the enemy cannot compete. High-explosive shell are effective in bolting the enemy from their cover behind rocks, but shrapnel is often the only weapon which can effectively deal with the "flushed bird." It is to be hoped that shrapnel will always form a generous proportion of artillery ammunition in frontier warfare.

Tanks.—The light tanks proved their worth over and over again, and sceptics who a few years ago ridiculed their use in frontier warfare should now devote their energies to agitating for more and more of them. The knowledge that a few tanks are covering his advance or withdrawal is a great comfort to a harassed advanced or rear guard commander and may often obviate the need for resorting to that most exhausting process of establishing "lay backs." The greatest value will be obtained from tanks by using them to fire on *reverse* slopes of hills which piquets are climbing from the front. Such tactics threaten that weak spot of the tribesman—his getaway. The tribesman has a wholesome fear of tanks. It is therefore important to conceal them to the last possible moment if it is desired to make the enemy stand and so inflict casualties on him. Recently the 2nd Infantry Brigade has found a new role for tanks—probably the last they ever expected. In an operation carried out since the events described in this article it was seen that casualties incurred after a certain zone had been reached would have to be carried a long distance by hand, since the force was not returning to the camp from which it started ; nor could the tanks accompany the force into the terrain about to be traversed. To lessen the casualties to be carried by hand the Brigade Commander suggested, and the Commander, 9th Light Tank Company, carried into effect, the mounting of camel *khajawahs*, or ambulance saddles, on tanks, so that two wounded men could be carried on every tank so fitted. The device was tried out before the operation started and worked well.

Panorama Sketches.—The excellent panorama sketches provided by the 23rd Mountain Brigade, R.A., were of the greatest value. Not only did they enable officers and men to see "form at a glance," but they obviated the need for masses of six-figure co-ordinates in operation

orders. Practice in panorama sketching is rather out of fashion nowadays, but it is still of the greatest importance and should not be neglected, especially in Frontier warfare.

Surprise.—Surprise remains, as ever, the most important principle of war. No means should be neglected of getting your enemy in the spot where you want him and at the time you want him. This is hard to accomplish when one is dealing with so wily an enemy as the tribesman, but it can be done. Go for the objective which for some reason or other he *must* defend, let him think you are going by the route he hopes you will, and then go some other way. The Brigade Commander's scheming on these lines accounted much for the success of the action on the 29th April.

Physical Fitness.—Campaigning on the Frontier at any time, but particularly so in the hot weather, requires a high standard of physical fitness in all ranks. A wounded man at once becomes an encumbrance gladly suffered, because he is in no way to blame, but a man who falls out is more than an encumbrance, he is a menace. The suddenness with which trouble starts on the Frontier and the difficulties inherent in the prevention of the spread of such trouble at its outset often entail the bringing up from the interior of India of troops who, however well trained and efficient they may be, cannot from the nature of things always be as "hard" as might be desired. Hard marching and climbing with little sleep will be their lot. It therefore behoves all commanders, wherever they may be, to keep their men as fit as they possibly can.

Close Support by the Royal Air Force.—Perhaps the biggest development in Frontier warfare in these and subsequent operations has been the great strides made in close liaison between troops and the Royal Air Force, particularly in the matter of really efficient close support by aircraft. As the infantry advanced on the 29th April and flushed the enemy from successive positions it was a wonderful sight to see the aircraft overhead take him on and add to his discomfiture. Reports coming in from the flanks of enemy movement were communicated to the aircraft in a few moments, either by radio-telephony or the popham panel, and off went the machine to deal with it. All this was done by the Air Force officer standing beside the Brigade Commander and in the closest touch with him, and knowing exactly what was in his mind. When a withdrawal was about to take place, a fresh aircraft was usually ordered up, which kept a vigilant watch on the rearmost troops and the flank piquets and, on several occasions, prevented the enemy getting too close by machine gunning or bombing them. Twice have the 2nd Brigade put in a counter-attack to relieve the pressure on rear parties and to get away casualties, and on both occasions the aircraft were "in the picture" and ready to assist before the troops were on their starting line.

ZEPPELINS IN WAR AND PEACE

By AIR COMMODORE P. F. M. FELLOWES.

IN a recently published book entitled *Zeppelin*,¹ written by the late Captain Ernest A. Lehmann, a very gallant officer and German gentleman, there has appeared a valuable and complete account of the development and activities of airships both in peace and war. The book is replete with incidents and impressions from which important deductions will continue for many years to be drawn, and a delightful and whimsical sense of humour lightens the reading of an extremely interesting, though undeniably technical narrative. The outstanding impression it leaves is one of the unabated courage, determination and leadership whereby disaster after disaster was met and overcome.

The psychology of the successful airship man is a different one to that of the aeroplane man, and it is nowhere more clearly shown in all the characters in the book than in Ernest Lehmann himself. If the account of his various war flights is carefully studied it will be seen with what remarkable judgment he appraised and calculated the risks, chances and value of the objectives to be attained. He evidently had such complete confidence in his own cool and determined courage that he did not have to take unwise risks to prove it at the expense of his ship, his crew, or himself—a comparatively rare and valuable quality in any man, but particularly so in the case of the airship man, where responsibility for valuable personnel and material must always weigh more heavily than with the aeroplane man.

In describing the development of the observation car, he says: "Every time we crossed our frontier we had to count on getting into a hornet's nest. Gemmingen and I racked our brains. . . . We finally struck upon the plan of lowering from the airship a small observation car, from which the observer could set the course and direct the bombing while the airship followed its course in a cloudbank thousands of feet overhead, unseen by the enemy. As an engineer, it fell to me to work out this idea technically." The first observation car was an old butter tub, fitted with a tail-piece, suspended by a steel cable and springs from a hand windlass and connected to the airship by a field telephone. "I crawled into the butter tub and gave the order to lower away. At

¹ Published by Longmans Green & Co. 15s.

first this was done smoothly, and as the steel cable began to roll out, creaking and groaning, I sank like a bucket into a well. But when about five hundred feet below the ship I began to be tossed about rather painfully, and I had some difficulty retaining control of my butter tub. I squinted mistrustfully at the cable, which was not over strong. . . . This uncomfortable feeling accelerated the calculation I was making. With a pocket compass I determined the direction to be taken by the ship and telephoned my orders to the blindfolded helmsman in the control car. The orders were carried out promptly and the ship went in the direction I indicated. I was hoisted inboard again."

As a result of this experiment, they perfected the observation car, and Captain Lehmann and Baron von Gemmingen were able to test out the value of their device under the wide latitude the weather sometimes enforced and which they were wisely given in the selection of their targets. They had intended to try it out over London, but, after unsuccessful endeavours to locate London in a fog, they actually tried it out over Calais, and, strangely enough, no mention is made in the book of the noise of the falling bombs whistling by the observation car. He says: "We turned and steered for Calais. Much to our surprise the weather conditions there were actually ideal for the testing of our observation basket under fire. The clouds were four thousand feet high, and the air beneath them was as clear as crystal. We could see the lights of Calais from miles away, and we prepared to attack. Gemmingen and I had a friendly quarrel because both of us wanted to get into the observation basket. Then Gemmingen pointed out that he was assigned to the airship as General Staff Officer and Observer, whereas I, the Commander, was obliged to remain in the control car. I had to admit that he was right. Before we reached Calais we throttled the motors so that they made the least possible noise while still permitting us to manoeuvre. The ship dived into the clouds, and Gemmingen was lowered two thousand five hundred feet in the observation car. In the infinity of space he was suspended like a disembodied ghost. But, as events were to prove, he was a dangerous ghost. When we arrived over the city, the observer hung two thousand five hundred feet above it and had a clear view, whereas his tiny gondola was invisible from below. The garrison of the fort heard the sound of our motors, and all the light artillery began firing in the direction from which the noise seemed to come. But only once did a salvo come close enough for us to hear the crash of the exploding shells. When we looked out of the car we saw nothing but darkness and fog, but Gemmingen directed us by telephone and set the course by compass. Following his instructions, we circled over the port for forty-five minutes, dropping small bombs here and larger ones there, on the railroad station, the ware-

houses, the munition dumps and other buildings. Later we learned . . . there was a great deal of theorizing as to how we had managed to conceal ourselves."

Lehmann also relates his sensations on approaching London during an attack he carried out in company with twelve other airships, and gives evidence of his respect for the English fliers and their incendiary bullets. Illustrative of the high state of nervous tension these men must have been in, is the effect the destruction of a sister ship had on a very brave man like von Gemmingen. To quote: "I was in the chart-room bending over the maps to set our homeward course when Gemmingen let out a scream. I looked back, and in the direction from which we had come I saw, far behind us, a bright ball of fire. Despite the distance, which I estimated at thirty-eight miles, we knew that the flaming meteor on the further side of the city could only be one of our airships. . . . The flaming mass hung in the sky for more than a minute; then single parts detached themselves from it and preceded it to the earth. Poor fellows, they were lost the moment the ship took fire. We remained silent until it was all over, and then realized how easily the same fate could have overtaken us if we had not been fortunate enough to find clouds when we needed them. The *Star* printed a protest against burying the 'infanticides' with full military honours; but the English soldiers honoured not the fallen enemy, but their dead comrades."

In a description of an attack upon London on 23rd September made by some improved Zeppelins (they were always trying to get above the attackers) he remarks: "For emergencies, there were not only cork life-jackets and parachutes, but even two light life-boats. . . . These life-saving devices, all things considered, were of small practical value, but they may have had some good effect upon morale." He continues: "In view of the more deadly defence, we were no longer able to load the ships so heavily." At midnight the three Zeppelins reached the city of London from different directions. "The English could darken the Metropolis as much as they liked but they could not conceal the Thames." "My own experience—I was over London for the fifth time—had taught me the capital had a weaker defence in the South than the North and North-East. . . . When half an hour after midnight we crossed the Croydon defence zone the 'L 31' was caught in the merciless beam of a searchlight. But we outwitted the enemy. We dropped parachute flares whose bright light made it temporarily impossible for the defenders to see the airship and, in addition, confused them because they mistook the flares for the signals of an English flier to 'cease fire.' The 'L 31' laid a line of explosive and incendiary bombs right across London without suffering the slightest damage."

It is interesting to compare this triumphant account with helmsman Marx's tribute to General Count Zeppelin: "The old gentleman was a man! a nobleman! Not because he was a Count, a General, a Chamberlain, 'His Excellency,' but simply because he was a fine person, strong of character, yet full of kindness, conscious of his worth, yet modest and religious. I think he said a silent prayer before every voyage, and after the voyage was over he must have given thanks. When the first naval dirigible took off and everyone congratulated him, he took off his white cap as if at the command, 'Hats off for prayer!' and he said softly to himself, 'How little I had to do with it.'" But still greater is the contrast of disaster, when it came: "Suddenly the sky burst into fire as if a stroke of lightning had split it apart. The 'L 32' . . . was overtaken by fate. For eighteen terrible seconds the blazing ball hung like a fateful planet in the sky. Then it burst asunder. A glaring mass with a tail of whirling flames fell like a comet in Billericay, East of London. Millions of Englishmen witnessed the catastrophe. . . . The Britons, apparently so even-tempered and composed, broke out into frenzied cheers and danced like mad in the darkened streets."

Other impressions of the author when he was engaged in an airship raid are: "A peculiar feeling overcame me as we hovered so high over the enemy's territory. Before going to sleep every human being down there in the thickly-populated island probably prayed to God that bad weather or moonlight might keep the German airships away, or that, if they came, they would be shot down." And: "When an especially bright incendiary shell flew close by us one of my men involuntarily cried, 'Look out!' That in itself was fairly funny, but another man, who was just getting into the control car, stiffened up at this warning and stood to attention. . . . Our ringing laughter revealed the joke to him." Again: "This enemy was, God knows, only concerned with the military objectives which made the British Empire the storehouse of the World War, but it was inevitable that many bombs missed their mark and demolished dwellings around the docks. Those poor people saw their little goods and possessions go up in flames."

Lehmann knew what fire meant. Early in his airship career he had emerged badly burnt from the destruction of an airship. In a graphic description of the destruction of "L 48," from which three men were saved, he says: "As the wireless operator reported the raid successful, the sentry in the stern reported fire. The Commander, Schütze, without losing his composure, remarked, 'It is all over,' and one man, remembering the regulations, grumbled angrily to himself, 'No smoking allowed.'"

The Commander of the whole airship fleet, Peter Strasser, was shot down on 5th August, and Admiral Scheer, Chief of the High Seas Fleets,

honoured him with a great tribute to his leadership. He certainly was a remarkable man. Amongst many other incidents of the War, Lehmann relates how "L 53" was lured to its destruction by the North Sea Destroyer Flotilla towing barges from which an aeroplane ascended. He also gives the total losses in airships and personnel during the entire War.

There follows later a long and interesting description of the German efforts to promote Americo-German Airship Commercial air lines, and the difficulties they encountered as a result of the conditions laid down at the Armistice. The author also describes incidents in airship development which happened from time to time. The accounts of the various tests and demonstration flights are vivid and arresting word-pictures interspersed with much business and technical detail—the latter extremely interesting to those who are interested in such matters. Finally there is a chapter on the disaster to the "Hindenburg," written by Commander C. E. Rosendahl, one of the world's leading airship experts and America's most experienced airship captain. He mentions "Dr. Eckener, beloved, admired and respected by the entire world," who had the sad duty of presiding over the enquiry. He also, in the Preface, gives an appreciation of Lehmann. In his analysis of the causes of the accident he does not come to a final conclusion and leaves sabotage as a still possible cause. He mentions that scientific investigations are to be undertaken in Germany, and the participators in these investigations have recently come to the conclusion that there were five special conditions existing simultaneously at the landing of the "Hindenburg" which were sufficient together to account for the ignition of the hydrogen gas. These were :—

- (1) The presence of a mixture of hydrogen and air within the cover, which did not escape in the normal way, as the "Hindenburg," being stationary, had no ventilation due to speed ;
- (2) A layer of rain on the fabric, which was insulated from the metal framework, thus making a giant electrical condenser ;
- (3) The grounding of the ropes at a height when there was a considerable difference between the airship and ground potential, due to this and the recent thunderstorm ;
- (4) The thunderstorm having caused recent rapid changes in air and ground potential ;
- (5) The damping of the ground ropes intensifying their conducting properties.

THE FUTURE OF THE AIRSHIP

Reading this book and remembering the series of disasters which has overtaken airships, and the great post-war developments which have occurred in the speed and range of heavier-than-air aircraft, it would appear at first sight that there can be no commercial or military future for them. I think, however, this may prove itself to be an erroneous view in both these fields. In the commercial field the airship's record for safety, despite the accident to the "Hindenburg," is a very good one, even when using hydrogen. If it proves possible to obtain sufficient supplies of helium from the United States to operate a commercial airship line then, in my opinion, the comfort obtainable in the airship will enable it to compete with ships and aircraft. The public will always pay for comfort and speed and, despite the reduced economic efficiency of the airship because of the 8 per cent. reduction in lift consequent on the use of helium, commercial airships may yet be made to pay. The commercial airship of the future may use a combination of hydrogen and helium. This is not a new idea and, although it involves great complications in gas bags and gas-bag suspensions, it is, I believe, technically possible, and if so there is little doubt that governments would be prepared to subsidize such ships for their potential uses in war. With such a lifting medium they would be far less vulnerable to attack by aircraft.

Hydrogen airships in war could only be used in areas where enemy heavier-than-air craft were very unlikely to be encountered. The large oceanic spaces are such areas, and if airships were provided with such moral supports as life-boats and parachutes, etc., it seems that they could be considered a normal, economical and efficient method of reconnaissance and communication. Their powers of discovery and attack against submarines are unequalled by any other agency, and from this point of view alone they seem to be economic. To arm a hydrogen airship with fighters for purposes of defence against other aircraft appears to be almost a wasted effort. If a hydrogen airship is sighted by a determined pilot in a modern aircraft there should be no time to defend it, and the target is so enormous it should not be possible to miss it; however, with parachutes and a life-boat, which can be dropped by parachute, the crew have still a sufficiently sporting chance of life, and it would appear to be a sounder policy to devote any spare lift to carrying this equipment rather than fighters.

In the case of a helium-filled airship the matter is quite different. Here the chance of defence is good, both from the airship platforms, and by accompanying fighters. It would not be possible to effect the ship's destruction or even disablement without a direct hit by a heavy bomb

or shell because helium is non-inflammable, and the complexity and redundancy of the airship's structure makes it quite impossible seriously to damage it with machine-gun bullets and very difficult to break it up.

The uses to which the German airships, as related in this book, were put during the battle of Jutland clearly proves their value in such cases. Even if the loss of an airship were certain, its sacrifice would be warranted if it had been the means of giving an accurate report of the movements and position of the enemy fleet. Such a report might be the deciding factor in the success or failure of a nation's entire war effort. There can be no question that as a method of long and sustained reconnaissance airships are unrivalled and, on this ground alone, there are several nations in the world to whom, in my view, their development is economically justifiable. They are the United States, Great Britain, France, Italy and Japan. Germany, the only country pursuing their development wholeheartedly, as far as I can see, would, for her own purposes, find little use for them in war.

Finally, it is impossible to refute Commander Rosendahl's inference that "the United States, with its practically inexhaustible supply of helium and its wide oceanic spaces on either flank, is, of all World Powers, best suited and equipped for airship development." The question we must ask ourselves is are *we* economically justified in abstaining from airship construction, and are we right in dispensing with their services as a means for combating the submarine menace and other forms of attack on our trans-oceanic trade routes?

THE GRÆCO-TURK EMERGENCY, 1922-23

A REGIMENTAL OFFICER'S EXPERIENCES

By CAPTAIN C. R. A. SWYNNERTON, The North Staffordshire
Regiment (The Prince of Wales's)

POLITICAL emergencies calling for the despatch of troops from their peace-time stations are now so fashionable that it may be of interest to describe some aspects of the emergency that arose in Turkey shortly after the conclusion of the Great War. This emergency is usually referred to as the "Chanak Show," and, although Chanak was where our strongest resistance undoubtedly lay, it is not generally known that military preparations also took place at Scutari and that later on British troops were quartered in Eastern Thrace for probably the first time in history. In this article it is proposed to describe the activities of one of the reinforcement units outside Scutari and its further employment in Thrace and on the Maritza.

The beginning of 1922 saw a British Army of occupation at Constantinople, and a Greek army based on Smyrna endeavouring to secure for Greece the richest portions of Anatolia from the domination of her traditional and apparently helpless enemy. At this time large numbers of Greeks inhabited Western Anatolia, so that the invaders were not without friends to welcome their arrival. The Greek Army was perilously near Angora, the centre of resistance of the rebellious Nationalists under Mustafa Kemal, who was striving desperately to build up an efficient army from the war-weary and shattered Anatolian peasantry, in defiance of the dictates of the Sultan. The Greek army, on the other hand, was torn by political dissensions and for some time had lain supine and inactive in its lines. Mustafa Kemal was therefore left in relative peace for some vital months and eventually, choosing his own time, struck such a blow at the Greeks that he drove them helter-skelter out of Anatolia in one of the greatest routs of the century.

The "emergency" as regards Great Britain now became acute, for the Nationalists, flushed with success, swept up towards Constantinople, causing grave anxiety amongst the Allies. In consequence British reinforcements of all services were hurried out to Turkey from our Mediterranean garrisons and from England.

At this time the author's battalion was stationed at Gibraltar, when one day in September, 1922, we received forty-eight hours' notice

to move to Turkey. A troopship, outward bound to India with drafts and families, was diverted to Gibraltar, her passengers were unceremoniously put ashore for an indefinite time and the battalion embarked. The only item of interest on the journey was the number of refugee ships encountered in the Ægean and Eastern Mediterranean, steaming apparently as fast as possible for less turbulent shores. Early one morning we arrived off the Golden Horn and learnt that our destination was to be Bostandjik, a few miles down the railway from Haidar Pasha station. Before we could go there, however, we had to march through the streets of Constantinople as a demonstration, and shortly after breakfast we boarded the ferry boats which took us to Galata Quay. For most of us that was a strange march. The men were chiefly young soldiers, few had been in that part of the world before, and the unfamiliar sights, sounds and occasionally smells of that great city with its heterogeneous population produced vivid impressions. The Turks still wore their traditional garb—the fez and baggy Moslem trousers; ragged and destitute Russian soldiers, remnants of Denikin's armies, stood gaunt and haggard in the press to watch us pass; quaint little men in British khaki with Australian hats were at first mistaken for Gurkhas, but turned out to be Kalmucks who had been recruited as transport drivers for the army. Sailors from almost every European fleet and the U.S. navy were there; there was also the sight, hitherto unfamiliar to us, of a guard of French troops from a battalion which seemed to contain as many negroes as white men, and further on a guard of Italian Carabinieri. Up the hill from Galata we marched, along the Grand Rue de Para, and eventually arrived at Yildiz, where The Buffs were our hosts and entertained all ranks most excellently. A short march down the hill took us to the ferries waiting in the Bosphorus, and back we went to our troopship. Next day we moved to Bostandjik camp, a collection of Nissen huts near the shore of the Sea of Marmora and formed a brigade with the Essex Regiment and the Gordon Highlanders.

Our first task was to prepare a defensive position from Erenkeuy on the Marmora to Candilli on the Bosphorus, the line including the Chamlija hills. If memory serves correctly, the artillery support for the whole line, some six miles long, never exceeded more than one brigade less a battery. Warships there were in plenty, but we did not know whether in the event of attack they would stay and risk being bottled up in the Sea of Marmora or, if they did stay, whether their fire would be effective against ground troops. Our sector of the line, moreover, ran among the houses of Erenkeuy, which, with their gardens, afforded excellent cover for the attack. This line was manned in skeleton every night. One platoon was detached down the railway to Gebze,

the reputed burial place of Hannibal, beyond which the Turks had by this time undertaken not to advance. Incidents naturally occurred here, for foraging parties of Turks continually crossed the boundary, and one night the platoon commander awoke to find that his little command had been surrounded by cavalry who were slowly closing in upon him. His men were behind their sandbags with rifles loaded and Lewis guns cocked, and in the dim light the Turkish horsemen could be easily perceived. A Turkish officer eventually arrived, but could speak neither English nor French, but his manner clearly showed that he intended to turn out the British platoon. The platoon commander knew no Turkish, and his French vocabulary extended little further than the one word "*Allez!*" which, as it turned out, was also part of the Turkish officer's linguistic armoury. Eventually, however, the Armenian interpreter was discovered under the coal of the locomotive that always stood there and was dragged forth. The affair terminated by the Turk agreeing to withdraw for the night, but he demanded to see a more senior British officer next morning or, he stated, he would return and mop up the platoon—no idle threat on his part, as most of the Turkish army was in close proximity. A field officer was sent up next morning and the incident was satisfactorily settled, but such events show how much responsibility has at times to be borne by very junior officers. Had this platoon commander lost his head and opened fire, which he had every right to do, such was the temper of the Turks at that time that hostilities on a large scale would undoubtedly have broken out once more, and whatever the eventual result might have been there is little gainsaying the fact that few of the Christian population of Scutari would have survived.

The general situation now began to improve, but the usual crop of rumours went round regarding imminent hostilities. Nor were these rumours confined to the troops in and around Constantinople. For away in Gibraltar some scaremonger stated, on the usual unimpeachable authority, that "the regiment had been cut to pieces," with the inevitable reaction on the wives and families left behind. One article of the agreement with the Turks provided for the retrocession to Turkey of Adrianople and Eastern Thrace, then in Greek hands; in this the Greeks saw dissipated for ever their dream of possessing Constantinople. Moreover they said, with a good deal of truth, that they were in effective military occupation of Eastern Thrace and that, while they, as a nation, had little interest in the Anatolian campaign, they were prepared to defend to the utmost their claim to what they regarded as legitimate Greek soil. Furthermore, they argued that without Eastern Thrace they would have no room in Greece to settle the hordes of refugees pouring into the country from Anatolia. However, to save further

bloodshed the Allies insisted on the return of Thrace to the Turks, and in order to supervise the evacuation of Greek peasantry a mixed force of British, French and Italian troops was drafted into that part of the country. Thus it came about that one morning we found ourselves detraining at Uzun Keupri, the last station on the Orient Railway before the Maritza is reached. Battalion Headquarters remained at Uzun Keupri and companies were detached to various villages, the furthestmost being sent to Hairobolu, three days march away in an easterly direction. The Greeks needed no incentive to clear out—trains crowded with refugees and their belongings crept miserably towards the Maritza, and so full were they that the roof of every coach was packed with its pathetic freight of human beings. Whole villages lay empty, and here and there were signs of struggle preceding evacuation. In one house lay a Greek with a pickaxe through his chest, and in the courtyard outside the body of a Turk, with his head neatly drilled by a bullet, was already being inspected by the large and famished dogs that infested every village. Built on the lines of Alsations, these dogs were a real danger, for, making common cause in their hunger, they collected in bands and devoured whatever they could find. Individuals on foot and alone were in no enviable situation when meeting one of these packs.

The first night on the line of march of the Hairobolu company was spent at the Turkish village of Chepkeuy, which was completely deserted. Presently, however, a Turk appeared—the *mukhtar* or headman of the village as he turned out to be—and, after satisfying himself that we were British and not Greeks (many of the Greek troops were clothed in British pattern uniforms but wore a distinctive cap), he implored us to send an officer with him to a neighbouring ravine where his people were hidden. Accordingly an officer and an Armenian interpreter went with the man, and looking out over the ravine not a living soul was to be seen. The *mukhtar* then shouted and, holding up the officer's hand in his own, apparently called out that all was well, for the next instant almost every bush and tree came to life as men, women and children came out of their hiding places. We were the centre of interest most of the night and were almost forcibly presented with so many eggs, chickens and geese that their transport next morning became quite a problem. The next day's march across the rolling Thracian countryside was uneventful. Needless to say, there was no road and the tracks were poorly defined. We spent the night outside a deserted Greek village. Next morning on the last stage of our march we encountered a Greek regiment making for the frontier. The appearance of the men was agreeably surprising; they seemed cheerful and well set-up, bandied jokes in English with our troops and looked quite useful material for

an army. Later on we were to have an opportunity of seeing some more of the Greek army at closer quarters.

Hairobolu was quite a good-sized village, and two houses—both luckily empty—seemed to cry out to be used as billets. One was big enough to take the whole company, and the other was just the right size for an officers' mess. Our optimism received a severe shock. Their condition was indescribable. Filth lay everywhere—on the floors, on the steps and even in the cupboards and on the mantelpieces! In the courtyard an ox had been slaughtered, and its entrails lay scattered about at random. Coagulated blood surrounded the remains of the carcass, and wherever there were no fragments of ox there was more and more filth. We beat a hasty retreat to the open air and decided regretfully that we would have to use our tents again for some time. The nights were now getting distinctly cold, and we did not at all look forward to spending a Balkan November under canvas. However, after about a fortnight we got the houses into a fit state for occupation and moved in.

While at Hairobolu, platoons took it in turns to go away for three or four days at a time, visiting neighbouring villages and showing the flag. Wherever we went we were greeted with the utmost enthusiasm and cordiality by the Turkish villagers, who invariably insisted on presenting us with so many chickens and geese that even the men soon tired of so much poultry. During our earlier days there the sight of burning villages in the distance was a common event. These fires were caused sometimes by parties of Greek stragglers or deserters setting alight to Turkish houses or by Turks burning evacuated Greek villages. We were powerless to do much to check all this arson, as there was no civil authority and as we had no mechanical transport and no horses, villages were invariably gutted before the infantry could arrive.

At last the great day came when the Turkish gendarmes were to take over the district. Triumphal arches had been erected at the entrance to the village, and that morning all the women of the place—up to now conspicuously absent from the streets—took possession of the garden of our billet, which, being on a small eminence, gave a good view of the track up which the gendarmes were to approach. The Turks arrived in due course, a goat was slaughtered in their honour beneath the triumphal arch, and later that morning a cold but correct meeting took place between the two commanders. We said farewell to Hairobolu and marched the thirteen miles to the nearest railway station, where we entrained, not for Constantinople but for the Maritza. Our role was now to be that of the jam in the Græco-Turkish sandwich. In company with a French and an Italian unit we were to spend the

winter on the Greek side of the Maritza until all threat of a further outbreak of hostilities had ceased. Battalion headquarters went to Kuleli Burgas (the station opposite Uzun Keupri, and now renamed Pythion), and companies were stationed down the river at Demotika and Sufli. The French went to Adrianople, and the Italians had Ferijik, a small village downstream of Sufli.

Sufli was the headquarters of a Greek division, and very soon we had established a friendly liaison with the officers of the divisional staff. Most of them spoke English, and many of them found their way to our mess in the evenings. Poor devils, they were wretchedly paid—a Greek captain with staff employment receiving rather less in drachmae than a British private! They were all heartily sick of war, as they had been either fighting or under arms since the first Balkan War of 1912. Their morale for all that seemed good and they were quite ready to have a go at the Turk for the sake of redeeming Eastern Thrace. At this time we had a lot of trouble with disbanded Greek troops, who still wore uniform, selling cheap and fiery cognac of a local brew to our men, who being unaccustomed to such potent liquor naturally paid the penalty. We complained to the Greek staff, and received the reply: "Next time you find one of these men selling cognac to your soldiers, catch him and hand him over to us, and we'll have him shot."

"We don't want him shot," we expostulated. "Can't you give him some lesser punishment?"

"No, no, that's all right," was the reply. "We'll shoot one or two, and that will soon put an end to it all."

Needless to say we didn't hand anybody over, and in any event, after the majority of our men had seen the painful effects of this cognac on one or two of their number, they avoided it of their own accord.

Parties of Greek recruits used to drill up and down the so-called main street, which was either frozen hard or a quagmire, according to the time of day. By this time it was bitterly cold. Our billets were none too weatherproof, and one platoon, who were in a weaving shed on the first floor of a building, found their top blankets as hard as boards in the mornings. This was due to snow and sleet drifting in from chinks in the walls and roof, alighting on the blankets and then freezing. However, like the British soldier everywhere, they kept remarkably cheerful and even seemed to enjoy their experience of a Balkan winter. Finding work and recreation was difficult. On one side of the village ran the railway line, and beyond that were groves of mulberry trees, cultivated for the silk-worm industry. Where the groves stopped, the flooded and partially frozen Maritza flowed angrily to the sea. On the other side of the village the hills rose up steeply,

so that finding a football or even basketball pitch was like looking for a needle in a haystack. The only place fit to walk on was the railway line, and that didn't afford us much scope, but somehow we managed to keep fit and cheerful. It was lucky the weather was so cold in one way, for the village was filled with Greek troops, and Greek ideas of sanitation are scarcely the same as ours. The state of a village under such conditions in a hot sun can best be left to the imagination!

Christmas came and went, and still there were no signs of our being moved, until at length in February we heard that we were to be relieved. By this time the weather was not quite so cold as it had been, rain came down in torrents, and the novelty of sitting on the banks of the Maritza had worn off long ago. So with a distinct feeling of relief we returned to Constantinople, whence, after a short stay, we boarded a trooper for India.

CONCLUSION

What, it may be asked, are the military benefits to a unit that takes part in an emergency such as this, when no fighting occurs? Chief among them must be placed the inculcation of self-reliance and initiative among all ranks, for individuals are compelled to a great extent to depend upon their own resources and their own ingenuity. This applies particularly to junior officers and non-commissioned officers, and is especially applicable in a country where the language is completely strange. In peace-time at home we are perhaps too prone to seek an "authority" before making a decision; indeed in administrative matters an "authority" is often essential. In this type of emergency decisions must be made and acted upon by those on the spot, as those hobbles on initiative—telephone wires, are usually non-existent.

Another valuable experience is that the internal machinery of a unit receives a more thorough and sustained testing than is possible in ordinary times, and every individual gets a sound knowledge of his particular job and a good idea of the next man's. All sorts of unexpected problems arise, and the practical administrative experience is worth weeks of ordinary field training at home. Specialists such as signallers, cooks, pioneers and transport drivers are compelled to work for long periods under conditions approximating to active service. Where cooking has to be done for the most part out of doors in all weather and at all degrees of temperature, cooks soon achieve a very high standard of efficiency. Much work is called for from the pioneers, who have to tax all their ingenuity to produce the desired result from the usually limited materials available, while transport men, be they grooms or M.T. drivers, obtain some very practical experience in the care of the horses or vehicles committed to their charge.

As regards actual field training, although annual programmes are completely upset, the change of scene is a welcome relief to all. No longer is the one dominant feature of the training area attacked from all points of the compass—here are new areas where with few exceptions troops can go wherever the commander wishes. Maps are often only approximately correct, and exercises become more interesting, as instead of training for a war in general terms, one has usually a single potential enemy and training can be directed upon the weaknesses in his organization, equipment and weapons. In short, one is faced with realities and not make-believe.

Then there is the broadened outlook upon the world conferred by close contact with a foreign people, their problems and their mode of life. Being an actor in the play stimulates interest in a subject obviously of national and probably world-wide importance. Such emergencies seldom concern Great Britain and one other nation alone, and participation in them excites discussion and gives a far greater grasp of the rights and wrongs and points of view of other nations, than can be obtained by reading the cursory and often biased reports in the newspapers, where in consequence of the highly commercialized state of our Press subjects of international importance are often accorded second place to the local sensation of the day.

Finally, and possibly of the greatest importance, is the knowledge gained by the officer of his men and vice versa. However good the relations may be between a commander and those under him, situations such as these bring officer and man into a closer comradeship. The former will receive one or two surprises, and it will be strange if he does not have to alter some of the opinions he previously held of his men's capabilities or failings. He will also have many opportunities to realize his own shortcomings, and if he is wise will be in a position to rectify them before their presence is attended with serious results.

DESTROYERS' BRIDGES

THE CASE FOR THE OPEN BRIDGE

By LIEUTENANT H. R. LAW, R.N.

AN article on "Destroyers' Bridges" which appeared¹ in last quarter's JOURNAL¹ may have misled some readers into thinking that our destroyer design is lagging behind foreign design in the matter of bridges. What is certain is that it will have caused many officers with destroyer experience to shudder at the heresies which have been quoted in support of the covered bridge. Having had some experience in navigating and manoeuvring destroyers with covered bridges of the "S" class and with open bridges of modern destroyers, I can claim to have a little practical knowledge of the subject, while my juniority will not allow the charge of bigotry to be levelled at me.

The arguments which were used to advocate the case for the covered bridge were as follows:—

- (a) Protection from the elements.
- (b) New construction cruisers and larger ships have covered bridges.
- (c) Absence of the nuisance of funnel smoke.
- (d) Increase of morale and protection.

Protection from the elements is desirable but not essential, and it is not a thing which should be insisted on to the detriment of the efficient working of the "brain" of the ship in action. If the weather is really dirty, any protection in the form of glass windows would have to come down in order that an efficient look-out could be kept. The idea of having a form of clear view screen all round the bridge which would be capable of being stowed away in action is not practical for constructional reasons; it would necessitate very cumbersome gear, which, in turn, would further restrict the view from the compass. The Officer of the Watch, look-outs, and signalman will all require open windows and in such weather these will admit to the bridge no small amount of water. Should the navigating officer be able to find a sheltered spot, he will be lucky indeed; lucky, that is to say, until the ship alters course, when spray coming from a different direction may cause havoc among

¹ "Destroyers' Bridges," by Lieutenant W. J. Van de Kastelee, R.N., in the JOURNAL for August, 1937, p. 585.

his charts and books—all the worse for the surprise of the attack. But surely no destroyer navigator is going to be put out by such minor difficulties as keeping his chart table dry and his notebook readable.

The plea that new and reconstructed ships are having covered bridges is made on faulty information. Some cruisers were given a covered bridge, but in the latest ships building and in the "Warspite," lately reconstructed, the bridge has been left open.

Funnel smoke is quoted as a nuisance in destroyers, but conditions are rare when either a high speed or a very small alteration of course will not clear the bridge and controls of smoke. Little weight can, therefore, be attached to this argument.

A covered bridge would, unquestionably, enhance morale if the ship were subjected to machine-gun fire. It would, however, afford no real protection because weight and expense would not permit of a bullet-proof lid, and, even if they did, it would not be in the correct position to ward off bullets from the direction in which aircraft would come. It was further argued that the restriction to the view overhead could be accepted, since any air menace, to be effectively countered, must be seen at an angle of sight easily obtainable on a covered bridge. This may be true, but what destroyer captain would be content to watch an enemy aeroplane disappear out of sight while he waited by the compass (from which position he must con the ship) until it reappeared at an angle of sight low enough for him to see it?

A further disadvantage of a roof to the bridge is that it would seriously handicap the signal department, since the leading signalman would be unable to see what hoists he had flying and at the same time remain close to the captain.

In order to have a clear view forward from the Gun Control Tower it was suggested that a "one-level" bridge should be instituted. If the captain happened to be a giant this would not inconvenience him, but a small officer would not be able to get a clear view on the quarter in action when the bridge is crowded with men. This would be a most serious handicap in fighting and manœuvring the ship.

It would appear, then, that a covered bridge would enhance morale in action and, in peace, it would give more comfort to the personnel. But, in action or at any time when action might be expected, the windows would have to be stowed away and the bridge staff, pampered by being accustomed to an enclosed bridge, would be unused to the rigours of the weather, and would suffer accordingly. It is hoped that the British Navy will never let personal comfort come before fighting efficiency, and there is a clear case that the fighting efficiency of a destroyer would be impaired by having a covered bridge.

MOTOR FUEL PROBLEMS IN GERMANY

GERMAN oil economics have undergone a fundamental change since the Reich Government, four years ago, announced a far-reaching programme for the development of motor transport, involving the formidable task of organizing German motor fuel supplies on the basis of a large and rapid extension of domestic output. In view of the emphasis laid upon the need for utilizing home resources, it is not surprising that the tendency has been to try and achieve this aim without due regard to considerations of cost and technical progress. All responsible quarters in Germany agree that not more than 10 per cent. of the country's present consumption of motor fuel can be covered out of indigenous crude oil production, even if development and drilling work are pushed to the maximum. Moreover, the need for a conservative estimate of possibilities in this direction is shown by the fact that the big increase in output during 1933-35, by no less than 80 per cent., was followed in 1936 by a rise of only 3.5 per cent. Nor have the authorities ever had any illusions regarding the very high cost of producing gasoline from coal, which is now being organized on such an extensive scale in Germany. So it was only to be expected that, in addition to the building-up of a synthetic motor-fuel industry, encouragement should also be given to the employment on a larger scale of so-called "substitute fuels," i.e., generator gas, high-pressure gas, liquid gas, and, in a wider sense, also steam and electricity—though the two last-named are not dealt with in the present investigation, which is concerned only with fuels for internal combustion engines.

PRODUCER GAS

The idea of equipping motor vehicles with gas producers, utilizing wood as fuel, was revived in Germany about six years ago, in spite of the failure of previous experiments in this direction. This was largely due to the initiative of agricultural and forestry interests, which advocated the use of domestic fuels as a means of providing a large outlet for the sale of otherwise unmarketable timber. The availability of ample supplies of suitable wood at an extremely low price provided material for effective propaganda in this connection. On the basis of 1 litre of gasoline being equivalent, as fuel, to 2.5 kilograms of wood

and a price of 3 pfennig a kilogram for wood ready to be used, as compared with 38 pfennig a litre of gasoline, it was maintained that an economy of up to 40-50 per cent. could be realized, even after allowing for the comparatively high additional charges for amortization, interest and repairs on the gas generating plant.

During recent years, much progress has undoubtedly been made in connection with the use of producer gas, on the technical side. Improvements have been effected in the cleaning of gases, with a consequent lessening of the deposits in engines, the weight of the gas producers and of the cleaning device has been reduced, operation has been simplified and the application of generators has been extended to charcoal, lignite, anthracite, briquettes, coke, etc. The use of producer-gas vehicles has meanwhile been stimulated by tax exemption to the extent of 50-75 per cent. of the motor vehicle tax, as well as by special subsidies of 600 marks on the purchase of new vehicles of this kind, and 300 marks on the adaptation of old vehicles to use gas. The installation of about a thousand so-called "wood-filling stations" has been projected, in order to provide supplies for the 2,000 or so producer-gas vehicles which are now in use in Germany. Municipalities were instructed to change over at least three-quarters of their lorries to domestic fuels by 1st July, 1936. From this stipulation the producer-gas vehicle has benefited very little. The most favourable estimate of costs cannot alter the fact that the necessity of carrying a gas-producing plant results in a reduction of the loading capacity by up to 20 per cent., that there is a distinct element of risk arising from the imperfect cleaning of the gas, and that one of the essential advantages of the ordinary motor vehicle is in this case lacking because of the time required for starting up the gas generator.

As far as the efficiency is concerned, it is known that the use of producer gas in internal combustion engines results in a lowering of performance by about 40 per cent., as the wood gas-air mixture contains only 550 kilo-calories per cubic metre as against 830 kilo-calories available in the gasoline-air mixture. By increasing the compression ratio, this difference can be reduced, but only after adjustments to the engine which are not always commercially feasible. Again, from the point of view of the driver, the producer-gas engine shows poor acceleration and responds very sluggishly to changes of speed and load, thus demanding considerable skill in handling, apart from the attention required by the plant itself and the necessity for constantly refuelling. Although, in spite of these drawbacks, it is claimed that wood-gas vehicles can still be advantageously operated in certain conditions, such as, in the case of a 3-ton vehicle with a minimum annual mileage of

10,000 kilometres and upwards, even this claim can only be put forward on the basis of comparison with the gasoline engine. In practice, however, the field of operation of heavy lorries in which the wood-gas vehicle might compete is being dominated to a rapidly increasing extent by the Diesel motor, which the producer-gas vehicle can only hope to rival in very exceptional cases. The generator gas motor has, in fact, hardly any prospects of successful competition with the engines which it is trying to replace.

BOTTLED GAS

Conditions for the utilization of "bottled" gas, which is carried on the vehicle, are in some respects different. Such gas includes, on the one hand, high-pressure gases, such as town gas, coke-oven gas, methane, etc., and, on the other, liquid gases, such as propane, butane, "Ruhrgasol," etc. This second class is, from the point of view of heat value, even superior to gasoline. As such gases not only burn without carbon deposit and without smell, but do not knock even in engines of very high compression ratios, they are, technically speaking, almost ideal fuels.

In practice, however, there are considerable difficulties in the application of bottled gas in motor vehicles. Considerations of space and the weight of the fuel gas containers restrict the use of these gases at the outset to lorries of more than 2 tons, and severely limit the radius of operation of such vehicles. Conditions in this respect are especially unfavourable for high-pressure gases which have to be carried at pressures of some 200 atm., and require proportionately heavy containers. The new light gas containers constructed for this purpose have a weight of about 55 kilograms and contain 10.6 cbm. gas, which, in the case of town gas, for instance, is equal to about 7 litres of gasoline. A fuel tank containing 40 litres of gasoline would have to be replaced by six containers of town gas, which would mean an additional weight of 330 kilograms, apart from the difficulties of space involved.

The dead weight is considerably less in the case of the second class of gases, which are liquid at comparatively low pressures, and much lighter bottles can be used. Their weight is only about 60 per cent. of the weight of the contents, so that, assuming 1 kilogram of liquid gas equals 1.6 litres gasoline, 40 litres of gasoline can be replaced by 25 kilograms of liquid gas, which require a bottle weight of 15 kilograms only. But, although the radius of operation, in this case, is considerably larger than in the case of high-pressure gases, the use of liquid gases is limited by other considerations. These gases are by-products of the

production of oil from coal, coke-oven gas, and the cracking of crude oil, and their production is, therefore, dependent on the main processes and confined to the areas where those processes are operated. The fact that in recent years only some 15,000 tons of such gases have been produced in Germany—chiefly as a result of coal hydrogenation—is evidence of the comparatively small quantities available.

It is true that the production of liquid gas is bound to increase considerably with the rapid expansion of hydrogenation. It is estimated that this year some 130,000 tons will be produced and that in the next few years 20,000 vehicles could change over to liquid gases, i.e., more than three times the number of vehicles now in operation. It is, however, another question whether this will actually happen or whether the liquid gases will be used for other, and perhaps better purposes as, for instance, the manufacture of gasoline by polymerization; for the difficulties in the way of organizing an adequate distribution of bottled gas as a motor fuel are undoubtedly substantial. Liquid gases cannot at present in Germany be delivered to vehicles in the same way as gasoline is. It is necessary to fill them into bottles at the producing centre and to send these to various distributing points. Thus the fuel price is increased at the outset by the cost of the freight on the bottles and their storage, and to this must be added the additional expenses of distribution, changing and return of gas containers, all of which operates against the use of such fuels in motor vehicles.

Delivery in bulk from filling stations, as is done in the case of gasoline, can be carried out only with high-pressure gases, which are pumped under pressure into containers fixed to the vehicles, and there are at present in Germany fifty gas-filling stations of this kind. Moreover, there is no doubt that ample supplies of these gases could, if required, be made available, as the production of German coke is steadily increasing owing to the larger demand for smelting, which has risen by nearly 70 per cent. between 1933 and 1936, while there are some 1,200 gas works in existence in Germany. In practice, however, there is likely to be very little extension of the use of high-pressure gases as motor fuel, owing to the various objections mentioned above. In fact these, like the rest, are essentially "substitute" fuels.

POLICY FOR THE FUTURE

It is not surprising, therefore, that in spite of intensive propaganda and official support, the indications of a change-over of German motor traffic to the use of gas fuels are very slight. This is clearly shown by

the figures of registration of new commercial vehicles during the past two years.

Type of Engine.	Autobuses.		Lorries.		Tractors.		Total of Commercial Vehicles.		Percentage of Total Registrations.	
									1936	1935
Spark-ignition	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935
Diesel ..	914	827	31,250	22,648	292	383	32,456	23,858	60.1	59.8
Semi-Diesel ..	1,171	995	11,783	9,268	5,204	3,275	18,158	13,538	33.7	34.0
Generator ..	—	—	—	—	2,749	2,444	2,749	2,444	5.1	6.1
Bottled Gas ..	11	6	76	33	20	14	107	53	0.2	0.1
	9	—	505	14	11	—	525	14	0.9	0.0
Total ..	2,105	1,828	43,614	31,963	8,276	6,116	53,995	39,907	100.0	100.0

Of newly registered vehicles last year no more than 1.1 per cent. were driven by gas, and there is no great likelihood that gas will play a more important part in the German fuel supply in the future. That this has been realized by the German authorities was revealed at the last joint meeting of the National Socialist League of German Technique and the German Society for Mineral Oil Research, at which Dr. Bütetisch, on behalf of the Council for German Raw Materials, expressed the opinion that "only limited importance can be attached at the present state of technique to operations with steam, electric power, town gas, wood gas, etc." A month later the new German transport minister, Dr. Dorpmüller, confirmed this, when, in his welcome to the Reich Association of Automobile Industry, he said: "A few years ago, when we were still in the dark as to whether the synthetic manufacture of gasoline and diesel oil would succeed, the search for fuels in our own country was encouraged. Electricity, liquid gas, town gas, and generator gas were to serve as substitutes. To-day it is possible to take another attitude regarding these substances. I hope that, with the new regulations for their application in motor car and other operations, a good many of the difficulties will be removed which hitherto, and with good reason, existed in connection with an extended use of these fuels."

How quickly opinion on this subject has changed is shown by a reference to the statements made by the former Reich Transport Minister, Freiherr von Eltz-Rübenach, who, not quite two years ago, on the "Day of German Technique" in Breslau, expressed his regret that "the economic advantages which exist for certain kinds of traffic in the use of domestic fuels, such as electricity, bottled gas and producer gas, have not yet been fully realized. The public still requires to be much more widely informed on this subject." The public is now, as may be gathered, being informed along quite different lines from those recom-

mended at Breslau. To-day any exaggerated claims for substitute fuels are being discouraged and every effort is being made to secure the maximum possible production of liquid fuels from coal. That no stone will be left unturned in an endeavour to reach this aim is amply demonstrated by the formation of numerous new oil-from-coal companies by the coal-mining industry and the investment of a huge amount of capital in these undertakings.

CRUDE OIL

After the heavy increases of recent years, there was only a moderate increase in the output of German crude oil last year. Total production rose by 3.5 per cent. as compared with a rise of 36.6 per cent. in 1935 and 31.9 per cent. in 1934. The production of oil from new areas was largely counterbalanced by a decline in the output of several old fields, and it seems probable that the maximum production of the oil industry in Germany has already been reached.

It seems that the intensification, with Government support, of exploration work in new areas has so far yielded results which, in view of the substantial subsidies involved, must be regarded as anything but in accordance with the hopes entertained.

THE UNITED STATES AND THE SINO-JAPANESE WAR

By H. J. WHIGHAM.

HAVING just returned from accompanying President Roosevelt on a two weeks' trip to the Pacific North-West, I can safely say that at the present time¹ feeling in the United States is very strongly opposed to a war with Japan or any other country, and against any step being taken that could conceivably lead to war. I talked to any number of senators, Congressmen and leading citizens who boarded the President's train, and found that every one of them was consumed with zeal for peace. Many of the business men in the States of Oregon and Washington were particularly eager to preserve peace with Japan because she is a good customer for their lumber and other raw materials. But, on the whole, the desire for peace is not merely dictated by interest in the pocket-book. I found a number of high-minded men almost rabid on the subject.

Considering the readiness with which the average American will resort to force in ordinary everyday life—all the street fighting, bludgeoning and actual killing of last year's strikes aroused extraordinarily little public condemnation—one would not think that the nation was pacifist at heart. In fact, it is not and never has been pacifist; but I think that the present extreme anti-war spirit arises from two things. First from a general notion that war is a stupid and expensive pastime for any country, but especially for the United States, which have so much unexploited wealth at home that they have no desire to act as an aggressor, and such an isolated position that they need never fear attack; and secondly, because the average American thinks he was inveigled into the Great War by England and the Allies, and he is determined not to be made a fool of again. It would be well if the English people were to realize that, whatever glamour still gives a glow to their memories of those years of conflict, no such glamour exists for the average American who took part in it. A few George Apleys of the older generation may rejoice that they (or rather their sons) destroyed German militarism and made the world safe for democracy; but for the generation that actually did the fighting, the Great War was 'debunked' long ago. I do not mean that there are

¹ This article was written on 5th October, 1937.—EDITOR.

not many of that generation who are not glad they got abroad and had a great experience. But even those adventurous spirits have no illusions about the whole business. The vast majority think they were 'sold' and got nothing but a headache and a lot of bad debts out of the War.

England is regarded as the arch-conspirator, who by her superb propaganda lured the United States into the Great War in 1917, and who will probably lure her into another war before she knows what has happened to her. Americans literally walk in dread of England's wiles. English readers who have never credited their own Government with any of this demoniacal cleverness, and who are disposed to think that their rulers have been placed in power for their honesty rather than for their brains, may find it hard to believe that American opinion should be so misguided. But there it is. We travelled through a dozen States on the President's train, most of them several times larger than England, and everywhere we found a clamour for peace coupled with a fear that England might get them involved in war.

With such a background of militant pacifism, the President threw a bomb into his retinue of friends and journalists when his Chicago speech was handed round the Pullman cars the night before we reached that windy metropolis. For twelve days the President had been discussing farm legislation, irrigation and electric power, and been inspecting the spectacular dams and power houses on the Columbia River. We might have expected some stereotyped allusion to peace, since everyone was asking for it. But suddenly there appeared these typed sentences which looked very like invoking Article XVI of the League of Nations. The word "quarantine" may sound less awe-inspiring than "sanctions," but it amounts to about the same thing. The vital sentence in the Chicago speech was: "When an epidemic of physical disease starts to spread, the community approves and joins in a quarantine of the patients in order to protect the health of the community against the spread of the disease." The President meant to drive this point home, for he emphasized it with the words "Mark this well," which did not appear in the advance copy; just as when he was speaking of the Kellogg Pact and Nine-Power Treaty he emphasized the words "which America signed."

Roosevelt is not going to play the role of Wilson, who won a presidential campaign in 1916 by telling the people he would keep them out of war, and who shoved them into war in 1917. Whatever may be said about the President in other respects, all will agree that he is no drifter. His answer to all the peace talk is this speech which literally calls for action that may lead to war. He asks his people what is the use of crying "peace, peace" when there is no peace. If you really want peace you must ensue it. This speech was no sudden

result of his tour to the West. Weeks before he set out he must have been working towards a concrete policy.

Roosevelt really believes that a strict embargo against Japan levied by the great democratic Powers would do the trick. If Germany and Italy would join, so much the better. But that could hardly be expected. When the futility of the sanctions against Italy is brought up, his answer is that the sanctions policy was a joke; neither England nor France—the great protagonists of the League—ever intended to push it to the point of war. England even kept on selling oil to Italy with the flimsy excuse that if she did not do so someone else would. Roosevelt would have none of those half measures. He would shut off all trade with Japan both going and coming—not some trade but all trade; and not by progressive stages, but at once. Of course England and France and the Scandinavian countries would have to come in. Russia would be glad to join. And it would be clearly understood that there must be no cheating—no selling of oil from Persia or Bahrein, no selling of raw material from any part of the world where that material is owned by any of the allied quarantiners. The embargo must be so ruthless as to invite war. Roosevelt does not believe that Japan would dare to risk a war with England and America. He does believe that supine acquiescence in Japan's criminal burglary is far more likely to let us in for war than a show of combined strength in a cause that surely is just.

What are the obstacles to so simple a plan? First and foremost, it denies the very neutrality that Americans have shouted for and which they have enjoined on the President by Act of Congress. That is merely to say that the people will not stand for it; for, actually, any Act of Congress can be repealed in a few hours. At the moment of writing the plan is to call a special session of Congress for 15th November. The object of the special session is to pass farm legislation, and a child labour law; but if an international crisis has arisen, such legislation might have to wait, and an embargo Act might be discussed.

So the mechanics are all right. But can Roosevelt get Congress to vote an embargo against Japan while leaving China free to buy American goods? At this moment I should say emphatically no, *unless* he can convince the country that it is far better to take a strong stand now, which might remove the Japanese nuisance from China and bring about a chance of peace in the Far East for many years, than to let things drift from bad to worse until his country is literally forced into war. I am afraid this will take time and unlimited powers of persuasion. Normally I should say it was impossible. It is not safe, however, to discount Roosevelt's powers of leadership. In spite of the prayers and predictions of his opponents, the Supreme Court

controversy has cost him nothing of his amazing hold on the country. He may have lost a vote here and there, but he has gained quite enough to offset his losses. In all the States we visited between New York and Seattle his popularity surpasses anything that any President has experienced in his lifetime since Washington.

So it is not impossible for the President to rally the country to his call for justice. America did sign the Kellogg Pact, she did sign the Nine-Power Treaty. In fact, she was largely the creator of both. After all, the part of Pontius Pilate is not one that the great democracies can enjoy playing. The man in the street resents the action of Japan, and he got rather annoyed the other day when the President at a Press conference implied that Americans going about their business in the Far East could do so at their own risk. The American people disliked that, and in fact the President did not mean it literally. A week or so later Admiral Yarnell came out with a strong statement to the effect that Japan would be held responsible for all damage done to American life and property by her army and navy.

It need hardly be said that in promoting a positive policy in the Far East which must have the threat of war behind it to be effective, the President is taking his political life in his hands. It is safe to assume, therefore, that he believes his policy can win out provided always he can get the fullest co-operation from the great democratic Powers. His reasons for confidence are, I believe, as follows :—

First, he thinks the resisting powers of the Chinese have been under-estimated: the Japanese have a much tougher job than they were faced with in 1931 and 1932. Secondly, he believes that if the Chinese can hold out for a year they will wear out the Japanese financially and morally. Thirdly, there are rich Chinese outside China who can and will do a lot to supply the financial part of her needs. Fourthly, he is perfectly certain that Japan cannot consider for a moment waging war against the three great democracies. In other words, while an embargo always carries with it a threat of war if it is to mean anything, in this case the danger of Japan risking war against such a combination of Powers is infinitesimal.

Roosevelt's difficulties, then, are great at home; but they might be overcome. What about England? Can she possibly afford to risk the necessity of sending a fleet to the Far East? That is a question which we in America cannot answer. Yet one must suppose that Roosevelt has answered it to his own satisfaction. He would still stick to it that the mere threat of war with America and England would bring Japan to her senses, and England would hardly have to send another ship to Chinese waters. Before this article sees the light, events may have happened to change the problem or clarify the issue. All one can

safely say at this moment is that the American people are violently opposed to any policy which could conceivably lead to war; and, although they condemn Japan, they see no reason why they should send their sons to die for the sake of four hundred million Chinese whose civilization is so decayed that they cannot defend themselves against seventy million Japanese. Roosevelt, on the other hand, has in his mind a positive policy of quarantine which he believes would soon be effective if it were whole-heartedly applied.

A few years ago he would have had the nation behind him in upholding the "freedom of the seas"—that traditional policy of the United States, for which they fought the only two foreign wars that really amounted to much in American history—the war of 1812 and the Great War. Even the pacifistic Wilson had to fight for that right, which he so eloquently defended in speech. Yet the Congress and the people surrendered their vaunted freedom of the seas without a murmur just because they were afraid of getting entangled in the present Spanish Civil War. Roosevelt would also have been supported in maintaining that "Open Door" in China which John Hay proclaimed thirty-eight years ago in the face of Russia, Germany and Great Britain, who were grabbing spheres of influence at the expense of the rest of the world. That policy was affirmed again in 1922 at Washington and subscribed to by the nine Powers. Yet it went by the board in 1931 when Japan occupied Manchuria, and no real protest came from the American people. It is curious that John Hay should have so boldly declared for the "Open Door" at a time when America had no navy capable of maintaining her position, and when, in fact, it was the British Navy alone that could keep China open. And yet thirty years later, when America had a great navy and could outbuild any other Power, she practically resigned her rights in Asia.

In fact, in the last six years the United States have abandoned, without an effort to maintain them, the two historic elements of their foreign policy. It took the greatest upheaval in the world's history to produce this startling change in the American point of view. In spite of their victory in the Great War, they came out of it so disillusioned that they have now scrapped every other article of their foreign policy in favour of complete pacifism. Therefore, if Roosevelt can get the nation to follow him in his present desire to take an active part in settling, or at least improving, world conditions, he will be performing a miracle. And yet, if Japan sank an American ship in Chinese waters, who knows what might happen? I believe the American people would be up in arms in a moment, always provided they did not suspect that it was a foul trick of England to bring them in!

THE INTERNATIONAL SITUATION

THE SPANISH CIVIL WAR

INTERNATIONAL ASPECTS

THE Non-Intervention Committee has come in for much abuse, a good deal of which, in Britain, savours of being the petty manoeuvring of party politicians rather than well-informed criticism. But for students of the International Situation who are genuinely interested in the factors which make for peace or war, the real value of the Committee is that, in spite of verbal smoke screens to conceal a great deal of active *intervention* in Spain, it *has* acted as a deterrent to more drastic and open intervention which could only have led to open opposition—in fact to war. In colloquial language, the party has been kept tolerably orderly if by no means entirely clean.

These Notes in last quarter's JOURNAL left off at the stage when, on 20th July, a new British Plan was presented to the Chairman's Sub-Committee of the Non-Intervention Committee. H.M. Government sought the approval of the other Powers to try and obtain the agreement of both parties in Spain to:—

- (1) The establishment of international officers in the Spanish ports (to replace naval patrols).
- (2) The withdrawal of foreign volunteers.
- (3) Conditions governing the grant of belligerent rights to both sides.

At once the old clash of interests held up further progress. While a great majority of representatives expressed approval of the Plan in principle, Soviet Russia obstructed the grant of belligerent rights by insisting that this could not even be considered until the evacuation of all foreign volunteers from Spain was complete. Germany and Italy supported each other in maintaining that Russia had thereby "torpedoed" the Plan; the German delegate, Herr von Ribbentrop, going so far as to say, "We Germans have known for a long time that, but for Soviet Russia, there would be no Spanish civil war to-day." Whether that implied that Franco would have won by now, or that the *casus belli* would have evaporated, is not quite clear. In any event the atmosphere on 30th July was evidently getting so sultry that the Sub-Committee adjourned *sine die* to "enable the Governments to examine the situa-

tion." It met again on 6th August, but could make no better progress than to agree to adjourn again *sine die* for a "report on certain technical aspects" of control and supervision to be prepared.

THE NYON AGREEMENT

The ensuing weeks were, however, full of incident. An epidemic of attacks on merchant ships by belligerent warships, and—still more sinister—by submarines and aircraft whose nationality could not be identified, broke out in Spanish waters and in the Mediterranean. The British Government openly accused Franco of being the author of these attacks and informed him that they were illegal and "they must reserve to themselves the right to take such action as the occasion might demand." The Russian Government pointed an accusing finger at Italy for sinking two Soviet cargo ships, and the Spanish Government telegraphed to Geneva accusing Italian warships of having torpedoed five Spanish steamers. Italy scornfully rejected these imputations, and at a later date General Franco stated that he had "irrefutable proof" that two Soviet submarines were operating against neutral shipping in that sea.

The situation became so serious that on 4th September Britain and France agreed to invite the Mediterranean and Black Sea Powers and Germany to a conference at Nyon (Switzerland). Italy declined to sit at the same table as Russia, and shied at a meeting which was to be held at a place which seemed to her to be within the geographical, if not the spiritual aura of the League of Nations. Germany also declined on similar grounds and recalled the lack of "solidarity" she had experienced after the attacks on the "Deutschland" and "Leipzig." Both Powers, however, expressed their readiness to co-operate in remedying the Mediterranean situation and suggested that the Non-Intervention Committee (in London) was the most suitable body for dealing with it.

For once the obstructionists were ignored. The Conference met at Nyon on 10th September, the British representatives being Mr. Eden—Foreign Secretary, Lord Chatfield—First Sea Lord, and Sir Robert Vansittart—Permanent Under-Secretary to the Foreign Office. M. Delbos—French Foreign Minister, presided. He urged the need for speedy action, and speedy action was taken with admirable results. It was agreed that British and French warships would patrol the whole of the Mediterranean except the Adriatic and the Tyrrhenian Seas; territorial waters would be patrolled by the other Powers; Italy would be invited to patrol the Adriatic and Tyrrhenian waters. Moreover, it was decided that the naval forces on patrol would fire to sink any submarine attacking

a non-Spanish merchant ship or seen near a ship in circumstances which would indicate that it had attacked her.

Italy declined to patrol the waters assigned to her or to participate in the scheme save on a basis of "absolute equality" in the patrol of all parts of the Mediterranean. She was supported in her attitude by Germany. But Britain and France were not deterred from giving immediate effect to the agreement, and a force consisting of the cruiser "Cairo" and forty-one destroyers was organized by the Admiralty forthwith, while France contributed sixteen destroyers and four convoy ships. Aircraft were also detailed by both Powers to assist.

The effect of this determined action was almost instantaneous, and submarine attacks on neutral shipping in the Mediterranean have ceased. By 21st September, Italy had thought better of her position of aloofness, and agreed to attend a three-Power meeting of naval representatives in Paris, and on 30th of that month the delegates initialled a draft agreement whereby she would take her share in the Patrol. Meanwhile, on 17th September, Britain and France informed the other "Non-Intervention" Powers that they would discontinue the Spanish coast patrol, as they regarded the Anti-Piracy Patrol as being more important. This released sixteen British destroyers for the latter work. International control of non-intervention has therefore become limited to the observers who continue to sail in neutral ships bound for Spain.

Another casualty to a British destroyer was narrowly avoided when, on 1st September, a submarine of unknown nationality fired a torpedo at H.M.S. "Havock." The torpedo missed, but the "Havock" replied with depth charges: in the words of the official report, "with what result is not known." There is reason to believe, however, that the "Havock's" prompt retaliation had a salutary effect.

PROPOSALS FOR THE WITHDRAWAL OF VOLUNTEERS

The influx of Italian so-called "volunteers," and the possibility of that Power establishing herself in Spain or in the Balearic Islands, has been causing increasing anxiety to France, and in this Britain is by no means a disinterested partner. Mussolini has repeatedly declared that he has no such territorial ambitions; nevertheless a situation might arise which would give Italy a plausible excuse to "remain" as a matter of urgent necessity in order to support a *de facto* Franco Government; the alternative being a fresh outbreak of civil war.

When the Non-Intervention Committee met on 16th October, the French delegate—M. Corbin, urged the importance of effective steps

being taken to secure the immediate withdrawal of "volunteers." When a real start had been made in this, then certain belligerent rights would be granted to both sides. There should be no new departures from any country to Spain. He intimated that unless such agreement could be reached at an early date France would be compelled to resume "full liberty of action"—this, it was semi-officially stated, would mean throwing open her frontier for supplies to the Spanish government. The German and Italian representatives saw nothing in the proposals which could not be considered by their governments in a spirit of good will and co-operation; but M. Maisky, the Soviet Ambassador, promptly "threw a spanner into the works" by saying that the whole pretence of non-intervention was a "farce," and accused Italy of actively supporting the Nationalist cause.

A curious reaction to this new endeavour to reduce intervention has been a confession by Italy to the figure of 40,000 as the approximate number of her "volunteers" in Spain. This was extracted from her largely as a sort of defence against the Spanish Government's accusation that they number 100,000.

Up to date some progress seems to have been made towards agreement between the members of the Committee on the two main points at issue; but the continued objections of Soviet Russia to the granting of belligerent rights until the "last foreign volunteer has been withdrawn" have been holding up the proceedings. It is a little difficult to understand why this obstruction is tolerated by the other Powers, and why Russia is not ignored, as Italy was at Nyon, if she will not assist. Presumably France is fearful lest she might lose the support of a powerful military ally at some more vital juncture; but Britain should be able to tip the scales against unnecessary procrastination without upsetting France unduly.

NATIONAL PREJUDICES

Behind the scenes of the Committee's deliberations and discussions lie the fundamental prejudices of the various Powers for one side or the other in the Civil War. As has been said before in these Notes, Italy and Germany are determined to prevent the establishment of a Red regime in Spain. There are no divided policies or party politics within those two countries, and unless nations who have other views are prepared to back them by going to war they would do well to face the fact that the two Dictators are going to see Franco, or what he stands for, through. Soviet Russia sees in Spain an opportunity to enhance the power of Communism, which is really only Russian Imperialism in a thin disguise. France, with her unstable internal politics, sways

between communistic leanings and the individual conservatism of the *petit bourgeois*; her ever-present fear of her totalitarian neighbours makes her cling to Russia for military support, and this is an additional factor in inclining her against Franco and his Italo-German associates. As to unhappy Spain herself, her people are reaping the bitter crop of native instability, lack of political education, and religious intolerance and superstition, no less than of feudal oppression. Of late she has been the happy hunting ground of every sort of alien trouble-maker and international nuisance. Franco has now established his rule over some two-thirds of the country, and from all reports life, except near the fighting areas, is orderly and normal there. On the other hand, the "government," although very far from being either that originally elected or "democratic" in any sense of the word, appears to have purged itself of some of its worst elements, and to be functioning fairly efficiently within its sphere of jurisdiction.

Lastly, there is Britain, who, more than any other Power, stands between this civil war and a general European conflagration. The great mass of her more responsible people certainly do not want to see a Red Spain; equally they would not welcome a regime which might tolerate foreign occupation of Spanish territory, and which might constitute a threat to our sea communications. It is safe to say that their attitude was well summed up by Mr. Eden in his very striking speech in the House on 1st November, when he said, "We will join no anti-Communist *bloc* and no anti-Fascist *bloc*. It is nations' foreign policies, not their internal policies, with which we are concerned"; and "We offer co-operation to all, but we will accept dictation from none."

THE FIGHTING ON LAND

In the North, General Franco's troops continued their drive throughout August towards Santander. The Italian legionaries played a prominent part and their new Commander, General Bastico, who had replaced General Mancini, took upon himself to issue a "Special Order of the Day" announcing his intention of subduing the whole of the Asturias.

With a view to stiffening the resistance of the forces in the North, who were showing obvious signs of demoralization, the Government despatched some seven squadrons of aircraft, which came into action on 6th August in the Santander area. This was probably the largest concentration of Government aircraft that had yet appeared on that front; but they arrived too late to have any decisive effect on the fortunes of the campaign.

Following a rising by elements of the garrison and the civil guards against the Government authority, Santander was surrendered on 25th August, to General Davila, Nationalist C.-in-C. in the North.

Italian activities in Spain were again brought into the forefront by the publication of Signor Mussolini's telegram to General Franco congratulating him on the capture of Santander. An announcement from Rome, dated 28th August, stated, moreover, that 341 Italian officers and men were killed and 1,676 wounded during the period 14th-23rd August in the Asturias.

Mopping-up operations continued throughout September, and with the capture of Gijon on 22nd October, 1937, the campaign in the North was practically over. This has set free the Northern group of Insurgent armies for service elsewhere and constitutes a gain of much importance for General Franco. A glance at the "War Map" will make it apparent that approximately two-thirds of Spain have now passed into his control. Yet it would be premature to say that the Government forces are doomed to be defeated. As the Central Powers discovered to their cost in 1918, the situation depicted on "War Maps" is sometimes misleading and, besides territorial gains, other factors have to be weighed in the balance. Behind the apparent inactivity of the Government troops, plans have matured for a large-scale offensive towards Saragossa, in Aragon. In a local offensive designed to capture certain Nationalist advanced posts, the Government forces occupied Las Falinas, an important position dominating several miles of the Insurgent defences. A few days later the main blow was struck and after a month's hard fighting, the Government troops claimed to have penetrated to within a few miles of Saragossa and to have captured Belchite, the last strongly defended locality between their forces and the town. This success has been hailed in Valencia as the most striking victory for the Government since the Guadalajara battle in March last.

MADRID FRONT

There is little of importance to chronicle from the Madrid front, where there has been a lull since the battle of Brunete in July. The Nationalist counterstroke succeeded, on 25th July, in recapturing the battered shell of the village of Brunete after a fierce contest in which tanks, medium artillery and aircraft were freely used. The key position of Villanueva del Pardillo, however, was held intact by the British "Red" Battalion, after a stubborn resistance, and the general position on this front remained unchanged.

Government troops have been making steady, if unspectacular,

progress in Andalusia on the line Jaen-Cordoba. A number of local objectives have been secured, notably in the Pozoblanco and Penarroja sectors, and the Valencia columns have definitely entered the province of Badajoz, which has been in Nationalist hands for months.

With the approach of winter, the second campaigning season of the Civil War is drawing to a close. As compared with the situation in November, 1936, the Government position seems to have deteriorated gravely. But it may be that this opinion will prove to have been superficial. Behind the scenes, the Government authorities have been labouring hard to organize an efficient Army; and the spring of 1938 will show whether they have been able, in fact, to create troops really capable of undertaking offensive operations in the field. Their main problem has been that of officers. In this history is repeating itself yet again.

THE POWERS AND JAPAN

It is impossible to dispel the impression that Japan has seized on the opportunity afforded by European preoccupations to enlarge her sphere of influence in China. In spite of the almost daily propaganda and reports we receive from official Japanese sources and the declaration in Tokyo that no territorial acquisition is even contemplated, the symptoms point only too definitely to that being the true object of one party of the two which it proverbially takes to make a quarrel. Japan will not convince the world that it is otherwise until or unless she withdraws her armies from that part of China proper which they at present occupy.

Manchukuo has not proved to be the economic asset which it was expected to be. The Army dominates the Japanese nation and foreign policy, but it may not continue to do so unless the flame of almost fanatical patriotism can be kept at white heat by the promise of better things to come. The rich corner of China of which Japan is possessing herself by military force would be a prize worth keeping, and one which would be reluctantly returned. She has doubtless been spurred on in her project by the example of Italy in Abyssinia. It remains to be seen whether the Nine-Power Conference (already reduced to Seven-Power) at Brussels, with the United States as an active participator, will be able to deal more effectively with an "aggressor" than the League of (Some) Nations at Geneva could with that great Power standing coldly aloof. There is also the vital difference that many and far greater interests—not the least being American—are concerned in the future of China than was the case in Abyssinia.

THE SINO-JAPANESE WAR

SINO-JAPANESE tension has been of long standing and was deeply aggravated by the annexation of the Chinese Province of Manchoukuo (Manchuria) by Japan in 1932. Since then, China has made strenuous efforts to arm and to organize her defences, while Japan has spent very large sums on modernizing her forces and bringing up to date their equipment. Moreover, in order to consolidate her "take-off" in North China for possible activities in that area, the Japanese authorities have concluded a series of pacts of doubtful validity with local Chinese officials in the provinces of Chahar and Hopei.

The Central Government at Nanking found itself on the horns of a dilemma; unready for war, it was unable categorically to denounce these political intrigues for fear of precipitating a crisis; on the other hand the pressure of Chinese public opinion—as voiced by young Chinese organizations—which was not prepared to see North China added to the Japanese protectorate of Manchoukuo without striking a blow in self-defence, was not easily to be withstood.

NOMINAL CAUSES OF HOSTILITIES

As was the case in the Great War, it was a comparatively minor incident which fired the charge in the present Sino-Japanese conflagration. On 8th July, 1937, a picket of Chinese soldiers, belonging to the 29th Army, stationed near the Marco Polo Bridge at Liukouchiao, South-East of Peking (Peiping), fired on Japanese troops engaged in night exercises near the bridge. The Japanese demanded entry into the town to search for the "offenders," and, on this being refused, bombarded the town with artillery.

After abortive political negotiations between the Japanese military authorities and the local Chinese Council, Peking was, on July 28th, bombed from the air. This air-raid was, therefore, the first of that series of aerial bombardments of open towns which has so shocked the conscience of the civilized world.

The day following this raid, General Chiang Kai-Shek, President of the Republic, issued an appeal to the nation and declared that China was determined to fight to the last man to save the country.

Following a raid by Chinese soldiers on a Japanese aerodrome, the Japanese bombed Tientsin from the air as a punitive measure, the casualties amongst non-combatants being high.

On 9th August, an incident which was to lead to serious international complications occurred at Shanghai. A Japanese naval officer and his orderly, who were paying an unauthorized visit to the Chinese aerodrome

at Hungjao, were shot dead by the guards. As a result, Japanese naval and military forces were concentrated in the vicinity of the City, and demands were made on the Shanghai municipal authorities for an apology, compensation and punishment of the men concerned. It was also represented that Chinese troops should withdraw twelve miles from the city.

FIGHTING ROUND SHANGHAI

There was no response to these demands, and a week later, Chinese air forces bombed the Japanese flagship "Izumo," anchored in the Whangpoo River, off Shanghai. The raid was unskilfully delivered and several bombs fell in the crowded International settlement, killing and wounding over a thousand Chinese civilians and a few Europeans.

As a result of the prevailing insecurity the British, French and American Governments strengthened their forces in the Shanghai area and the British Foreign Office decided to evacuate all British women and children.

On 15th August, the Japanese launched a strong offensive in the Shanghai area and encountered stubborn resistance. Nanking, the Chinese capital, was bombed from the air. Anti-aircraft artillery and three squadrons of Chinese airplanes opposed the raiders, six of whom were claimed to have been shot down.

The Japanese Cabinet, after a special meeting, announced that their patience was exhausted, and that drastic measures would be taken to chastise the Chinese forces. They further declared that Japan harboured no territorial designs on China, and only desired to bring the Nanking Government "to reason." As a statement of Japanese war aims, this communiqué—although possibly intended mainly for foreign consumption—is of the highest importance.

During the week ending 25th August, fierce fighting continued in the Shanghai zone, the Japanese object being to land strong reinforcements and the Chinese to prevent them doing so. The terrain is waterlogged and intersected with ditches, poorly provided with roads and studded with numerous mud villages, and therefore strongly favours the defence. But the Japanese technical superiority, particularly in the air and in the heavy ordnance of the fleet, inflicted severe punishment on the Chinese troops. Portions of the International settlement were involved in the fighting zone and suffered severely from shells and aerial bombs. The British offer of mediation, by which both Japanese and Chinese troops were to withdraw from the vicinity of Shanghai, was rejected by Tokyo.

A CHINESE WITHDRAWAL

Fifty thousand Japanese reinforcements were reported to have landed in the Shanghai area during the week ending 3rd September ; and the Woosung forts, at the mouth of the Whangpoo river, fell into Japanese hands. With the object of evading the harassing fire of the enemy's naval guns, the Chinese forces, estimated at about 100,000, withdrew in good order to an entrenched position on the general line Liuho-Lotien-Chapei some miles from the coast.

The Japanese followed up as swiftly as the waterlogged state of the ground would allow, and delivered several hard blows at the Chinese lines in the Lotien and Liuhan sectors, both of which were captured. The troops holding the main battle position at that time, however, stood firm.

General Matsui, commanding the Shanghai front—an officer with twenty years' experience of China, announced on 8th October, " that his Army would use every means to subdue their opponents, and that the objectives of the Japanese expeditionary forces were not only to protect Japanese interests, but also to scourge the Chinese Government and Army, who had been pursuing anti-Japanese policies in collaboration with Communist influences." The General added that he was sorry for the many innocent people living in the war zone and that he would do what he could to protect foreign lives and property.

The Chinese line now formed an awkward salient in the neighbourhood of Kiangwan, which was enfiladed from both flanks. Tactics would have dictated a short retirement with a view to straightening out this sector, but the Chinese, fighting with fanatical fury, refused even to consider such a withdrawal. When we recall our own prolonged defence of the Ypres salient for sentimental reasons, we should not entirely condemn the Chinese leadership.

Fierce fighting continued, and on 18th October Chinese troops repulsed a heavy Japanese attack. Two days later, reinforcements arrived from Japan just in time to meet a Chinese counter-offensive, in the vicinity of Tazang. On 25th October, the Chinese resistance began to weaken, and the Japanese gained ground in the Tazang area where later they broke through suddenly and threatened to cut off the Chinese troops holding the Kiangwan salient. The bulk of these latter, however, succeeded in effecting their withdrawal and occupied new positions, with their right on Chapei and their left on Chenju. By 27th October, the advancing Japanese had cut the Shanghai-Nanking railway at Chenju station and forced the Chinese back in the South to the line of the Soochow Creek. The Chinese line then ran generally as follows from

North to South: Liuho-West of Lotien-Nansiang-Soochow Creek-West edge of Shanghai.

The Chinese defeat was serious but not disastrous; they have lost the use of the direct railroad to Nanking, but still control the Shanghai-Nanghang-Nanking loop line; their field army is still intact; and they have inflicted heavy punishment on the Japanese. Their own losses have been far more severe, but Chinese manpower is almost limitless, whereas Japanese is not. So far, Chinese leadership on the Shanghai front—as opposed to the Northern zone—has not failed and, indeed, has afforded grounds for a feeling of mild optimism.

OPERATIONS IN NORTH CHINA

The battle round Shanghai should not, however, be allowed to divert attention from events in North China, which is the main theatre of war, Shanghai being only a “side-show.” The first Japanese move of real strategic significance was the assault and capture, on 25th August, of the Nankow Pass, North of Peking, followed by the fall of Kalgan, the capital of Chahar province. The thrust along the Kalgan-Tatung-Paotow railway was executed with a view to covering the North flank of the main Japanese armies about to deploy South and South-West of Peking; to give them “elbow room” to manœuvre; and—perhaps most important of all—to obtain control of Suiyuan and Chahar provinces, thus severing all effective land communication between Soviet Russia, Mongolia and the Central Government at Nanking. The wide scope of this drive and the manner in which it was executed showed vividly the high technical competency of the Japanese General Staff and the efficiency of their troops. As a corollary, a Japanese Army order has dissolved the Hopei-Chahar political Council, the control of both these areas passing into Japanese hands.

Both Nanking and Tokyo have announced that they expect and are preparing for a long drawn out conflict; in the case of Nanking, this declaration is probably true, and here indeed lies their only hope of ultimate victory. If the Chinese can manage—in spite of defeats in the field—to prolong the war and to entangle the Japanese forces in the limitless interior of China, they may bring about an economic and manpower crisis for their enemy; this, coupled with a possible threat of foreign intervention, might have decisive results in favour of China.

The Japanese General Staff, on the other hand, are believed to have assured the Emperor and the nation of a speedy victory on the lines of the “Back for Christmas” stories with which we became familiar in the Great War. Moreover, there is a distinct possibility that the Chinese

forces may run short of some essential munition of war, in which case their superior numbers would avail them nothing in face of the well-equipped and resolute Japanese; or the Chinese Generals, unpracticed in manœuvre, may make a series of blunders and allow a substantial portion of the field army to be cut off and destroyed; in view of the superiority of the Japanese mechanized troops, this possibility cannot be ruled out entirely; or perhaps Chinese national unity—a fragile plant of only recent growth—may fail to stand the strain of a long series of defeats. In face of Japanese aggression, the spirit of unity amongst the Chinese appeared, however, to be strengthening, and General Pai-Chung-Hsi, for many years an opponent of the Central Government and leader of the separatist movement in Kwangsi, actually has been appointed Commander-in-Chief of all the Chinese armies in the field. The Chinese “Red” armies in Kansu and Shansi also have declared for the Central Government and are now enrolled under the national flag in the North.

JAPANESE DISPOSITIONS

Exact information relating to the Japanese dispositions is subject to rigorous censorship and is extremely difficult to obtain, but, according to *The Times*—whose contacts are second to none—the seventeen peace-time divisions of the Japanese Army were by the beginning of September all in the field; six divisions were believed to be engaged on the Northern front; three or four at Shanghai; five divisions employed on internal security duties in Manchukuo, and one similarly employed in Korea; the odd remaining division being at that time unaccounted for. Japan had, however, called up her reserves and would shortly be in a position largely to increase the numbers of divisions in the field by the mobilization of new formations.

The main Japanese thrust started on 15th September along the two railway lines Peking-Paotingfu and Tientsin-Tsangchow. After hard fighting, the Chinese troops recoiled on both lines, and the important centres of Paotingfu and Tsangchow fell into Japanese hands; the Imperial forces made strong efforts to cut off the Chinese left flank, but were unsuccessful. The loss of the defences in the Paotingfu area, which are said to have taken two years to construct, must have been a heavy blow to the Chinese troops and may well have shaken their morale.

With the march of events, the Japanese strategic plan, in its main outlines, had now developed fully. Three Armies, totalling some 80,000 men, were making rapid progress along three principal lines of attack. The Northern group was striking through Suiyuan towards

Paotow, the terminus of the Peking-Suiyuan railroad. The Central group was advancing rapidly southwards along the Peking-Hankow railway, with the subjugation of Shansi and Hopei as its goal and the Eastern group was thrusting down the Tientsin-Pukow railway with the object of crushing all opposition in Eastern Hopei and later in Shantung.

Some 300,000 Chinese troops were pitted against the invaders and offered a determined resistance but, lacking adequate artillery support and co-operation from the air, were crushed repeatedly by the superior technical resources and offensive spirit of the enemy. By 10th October, 1937, the Japanese strategic plan was, in fair measure, fulfilled. Wide areas of Suiyuan, Chahar, Shansi and Hopei had been wrested from the Chinese, whose troops were recoiling in considerable disorder, pursued by Japanese land and air forces. Thousands of Chinese had been killed, while the Japanese War Office announced their casualties since the beginning of the war until 21st September, 1937, as only 1,412 killed and 4,169 wounded. These figures, however, do not include the losses incurred by the Japanese fleet. Exploiting their success, Japanese troops seized Paotow, the terminus of the Suiyuan railroad and thus completed the bulk of their strategic task in that area.

The Chinese endeavoured to stand once more in a prepared position about Shihchiachwang, covering the railway junction between the Peking-Hankow line and the branch railway to Taiyuan. Their right flank was, however, enveloped by a Japanese detachment, which had rowed through the flooded areas of Central Hopei in boats and, being heavily assailed in front as well in flank, gave way in confusion. The Chinese rearguards offered little resistance, and by 17th October, Shunteh, some forty miles South of Shihchiachwang, was occupied by the Japanese van-guard.

The Eastern Group conformed to this thrust and occupied Enh sien, twenty miles South-West of Techow. Here the Japanese were within a few short marches of the Yellow River, which shields the heart of Shantung.

The attitude of General Han Fu-Chu, Governor of Shantung, had been doubtful, and rumours had circulated that he was contemplating some act of treachery towards the Central Government; but these fears were dispelled when he concentrated his troops and marched North to defend his charge. His actions may have been influenced by the check to a Japanese detachment, which had been operating in North Shansi as right flank guard to the Central Group. This detachment was assailed, on 13th October, North of Taiyuan, by the 8th (Chinese) Army—formerly known as the Shansi "Red" Army—and suffered severely.

But this reverse was a minor episode only in a campaign, which the Japanese had waged with remarkable success. In the face of strenuous opposition and in spite of flooded roads, the Central Group had, in less than six weeks, advanced a distance of over 250 miles. Their troops, full of the offensive spirit, had seized and kept the initiative and had exploited their victories to the full.

The Chinese resistance, on the other hand, was disappointing; as long as their flanks were secure, their armies had fought steadily and with cohesion, but directly the flanks were threatened the troops recoiled in disorder.

At the beginning of November, the first phase of the campaign, both in the North and round Shanghai, appears to have ended decisively in favour of the Japanese. But this does not mean that the final victory is necessarily theirs.

THE WAR IN THE AIR

Constant air fighting has been in progress over wide areas of China and the Chinese allege that the Japanese air forces have systematically attacked the civilian population. This is denied by the Japanese, who claim, on the other hand, to have destroyed a number of Chinese war-ships and 217 aeroplanes in the Shanghai area, and to have confined bombing to military targets.

Canton was first bombed by Japanese aircraft on 31st August, and has been systematically raided on many subsequent dates. The Japanese claimed that they were engaging military objectives on the Canton-Hankow railway, but large numbers of non-combatants, including women and children, are believed to have been killed in the crowded bazaars of the city.

On 19th September, 1937, Admiral Hasegawa, Commanding the Japanese Naval Forces, announced that his aircraft "would resort to offensive measures, bombing the Chinese forces and establishments in and around Nanking as the principal base of Chinese military operations." He advised foreign officials and residents to move from Nanking.

Several air attacks were executed on the capital, but owing to the fierce anti-aircraft barrage, which compelled the Japanese machines to release their bombs from an excessive height, few military targets were hit.

Canton was again bombed on 23rd September, and some 3,000 civilians are reported to have been killed, besides a host of wounded. This raid led to a strong Note from the British Government to Japan protesting against the bombing of civilian populations. France and the U.S.A. have also protested against the bombing of Nanking.

Whether these raids are due to the adoption of a deliberate policy of terrorism against the civil population or whether the pilots, unwilling to face the anti-aircraft barrages and defending aircraft, discharge their bombs at random, is not easy to say. In any event, the conscience of the civilized world has been stirred deeply against Japan and her aggressive actions in China.

INTERNATIONAL INCIDENTS

Dr. Kung, the Chinese Finance Minister, who is now in Europe, has visited Czechoslovakia and is reported to have placed a large order for munitions with the Skoda arms factory. This firm was responsible for the construction of the famous heavy howitzers, whose performances surprised the Allied military experts in 1914 and effected the rapid reduction of the Liège and other forts. But the pressure of the Japanese naval blockade and the absence of adequate road or rail communications from China to the outside world may place difficulties in the way of delivering such munitions.

Relations between Great Britain and Japan were seriously strained by the wounding of Sir Hughe Knatchbull-Hugessen, H.M. Ambassador to China, on 26th August, following a machine-gun and bomb attack by Japanese aircraft on his car, which was travelling from Nanking to Shanghai. H.M. Government despatched a strongly worded protest to Tokyo, and after some delay due to the necessity for detailed investigation, received a satisfactory apology from the Japanese Government. The life of the Ambassador was saved as a result of a blood transfusion from a U.S. marine.

Feeling the need for diplomatic support—even if only of a somewhat negative character—China concluded a non-aggression pact with Soviet Russia, the terms of which were published on 29th August. The pact is to remain in force for five years, and will safeguard China from any possible stab in the back, while she is engaged in war with Japan. If there are any secret clauses in the pact, no inkling of them appears to have reached world press associations. A spokesman of the Chinese Foreign Office declared that, if Japan would change her aggressive attitude, China would be willing to sign a similar pact with her.

CORRESPONDENCE

[Correspondence is invited on subjects which have been dealt with in the JOURNAL, or which are of general interest to the Services. Correspondents are requested to put their views as concisely as possible, but publication of letters will be dependent on the space available in each number of the JOURNAL.—EDITOR.]

GUERNICA

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—In the JOURNAL of August, on page 614, it is stated that on 27th April Guernica was bombed and destroyed by Insurgent aircraft, and that heavy casualties were inflicted on the civilian population; it was an act of frightfulness against unarmed civilians and a military measure of doubtful value.

The destruction of the town was determined upon by the Bilbao Government. Their position had become critical as no help could be expected from Valencia, and the Nationalist advance and capture of the Elgueta-Inchortas lines had demoralized the troops; some desperate act, such as the destruction of the ancient capital of Vizcaya, was necessary to unite and infuriate the retreating forces: the Nationalist advanced line was only four miles distant on the 26th.

The Salamanca Government has absolutely denied that the destruction of Guernica was caused by Nationalist aircraft, and the evidence of the inhabitants directly contradicts the statements of refugees made at Bilbao of destruction by incendiary and other bombs. The former assert that organized fire squads sprayed petrol into the buildings and set these alight with hand grenades, as was done at Eibar, and the appearance of the ruins confirms this. When the fires had burnt down, two days later, representatives of important English, American, French and other newspapers entered Guernica on the heels of the troops. It was then possible to make a careful examination under calmer conditions. Their conclusions, individual and collective, can be summed up in the report issued by the well-known French Agence, Havas:—

- (a) All the walls remaining standing bore no traces of having been bombed, i.e., there were no splinter marks.
- (b) In almost every case wooden doors and window frames were destroyed by fire or bore marks of burning, which indicated a petrol or paraffin origin.
- (c) An absence of bomb craters (four only were found).
- (d) Houses built of reinforced concrete showed a thick deposit of greasy soot on the inner walls similar to that left by petrol fires. Four mine craters had been exploded at strategic road junctions.

Some additional remarks by M. Max Massot, a well-known journalist of considerable war experience, are an indication of the care taken in sifting the evidence: "I have tried to make use of the advantage gained by visiting the town some four days later *modifying the hasty judgment* that the heat of the battle might have made me give on April 29th. I have deliberately dismissed as *suspect* the precise

and exactly corresponding evidence that I heard . . . an hour after the occupation. . . . I definitely conclude that the craters can only have been made by mines. . . ."

Other witnesses, at a distance of nine miles, heard no sounds of aerial bombardment that day. (If the question of distance is raised, I myself heard the bombing of Amorebieta and Gayatando at a later date at a distance of sixteen miles).

I personally visited Guernica a fortnight after it was captured, when I was given every facility for independent investigations. The conclusions which I arrived at, without knowledge of the foregoing opinions which I only became acquainted with later, confirmed them in every respect. I saw where three bombs had fallen in the streets, the marks of the bomb splinters were unmistakable on neighbouring walls; a fourth was reported which I did not see; also four mine craters, certainly never made by bombs, at road junctions. Not a trace was found of incendiary or other bombs alleged to have fallen on the farms in the neighbourhood.

If the bombing was of the great intensity alleged, how is it that many electric bulbs on street standards and under the long portico of the theatre (entirely destroyed by fire) were still unbroken when I visited Guernica?

By the law of averages, *either* a fair proportion of the bombs fell on the "open spaces" and must have left traces, *or* a standard of marksmanship must be attributed to the bombers which has never before been equalled, nor is ever likely to be. (Open spaces, i.e. streets, gardens, squares, etc., in Guernica are about three times the area covered by houses; in London they are about five times.) To assert that in a town, somewhat irregularly laid out and with winding streets, not a bomb fell except on the particular target is to ask people of common sense to believe the fantastic.

MORAL.

43, Belsize Square, London, N.W.3.

September, 1937.

ARTILLERY PREDICTED FIRE

TO THE EDITOR OF THE R.U.S.I. JOURNAL.

SIR,—Brigadier MacLeod's letter in the August JOURNAL is the best support that I could have hoped for for the views expressed in mine on the subject of Predicted Artillery Fire.

I do not think that he is right in saying that on 21st March, 1918, the German artillery, other than that in their 18th Army, fired by observation. I can find nothing in the *Official History* which supports the idea. The question has, however, but little bearing on the point at issue and the results obtained on the 18th Army front, where it is certain that predicted fire was the rule, are good (or bad) enough for my purpose. We are told that on the whole of that front *at one point only* was that fire accurate enough to see the German infantry through in their attack on the British battle zone. Comment is surely unnecessary!

From some passages in his letter it would appear that Brigadier MacLeod thinks that I am an advocate of observed instead of predicted fire. I am, of course, nothing of the kind. In a big attack predicted fire must be the normal; but what I do protest against are the extravagant claims made for the accuracy of predicted fire—claims which are clearly disproved in his own selected example dealt with above.

If he is still unconvinced, and in anticipation of the argument that results are now much more accurate than they were nineteen years ago, may I invite his

attention to the demonstration arranged by the School of Artillery for the benefit of the other arms in April, 1936. The result, as reported in *The Times*, was a complete fiasco, the chief sufferers from the fire being the dummies representing the friendly infantry. If this can happen in a carefully planned demonstration in peace-time, what about war? It is a sad reflection on the amount of interest shown by the other arms in a subject which vitally affects their welfare in war that the palpably inadequate and actually thoroughly misleading explanation or excuse issued at the time, again as reported in the same paper, appears to have been accepted by them without question.

With regard to Brigadier MacLeod's remark that predicted fire can be accurate enough if the gunner knows his job, I must reiterate that the finest gunner in the world can make but a very poor job of it unless he is supplied with ammunition of uniform excellence, and unless the weather prophet prophesies correctly. Anybody can estimate for himself the chances of perfection being attained here.

Finally, there is no reason why predicted fire should not be used successfully if the Artillery Commander knows enough gunnery to appreciate its limitations and makes his plans accordingly; but blind trust in an accuracy which experience has proved to be quite imaginary leads nowhere except to possible disaster.

G. P. MACCLELLAN,
Lieutenant-Colonel, R.A. (Ret.)

September, 1937.

NAVY NOTES

GREAT BRITAIN

ROYAL VISIT TO NORTHERN IRELAND.

The King and Queen arrived at Stranraer on the evening of 27th July and embarked in the Royal Yacht "Victoria and Albert" for their visit to Northern Ireland.

The Yacht left Loch Ryan early on the 28th for Belfast, escorted by the "Southampton," Captain A. M. Peters, D.S.C., flagship of Rear-Admiral T. F. P. Calvert, C.B., C.V.O., D.S.O., the "Newcastle," Captain J. G. P. Vivian, the "Exmouth," Captain L. V. Morgan, C.B.E., M.V.O., D.S.C., and destroyers of the Fifth Flotilla, except the "Escapade."

The King and Queen, with members of their suite, transferred to the "Exmouth" and proceeded to Donegal Quay, where they landed at 10.30 a.m. Among other events of the day, their Majesties visited H.M.S. "Caroline," drill-ship of the Ulster Division of the R.N.V.R., where they were received by Captain the Earl of Kilmorey, Commanding the Division. They returned to the Royal Yacht, which left shortly after 7 p.m. for Stranraer.

THE ADMIRALTY BOARD.

The First Lord of the Admiralty visited the Home Fleet in Scottish waters in mid-September in H.M.S. "Enchantress," and at the end of the month rejoined the yacht at Venice to visit the Fleet and naval establishments in the Eastern Mediterranean.

Rear-Admiral J. H. D. Cunningham, C.B., M.V.O., has been appointed a Lord Commissioner of the Admiralty and Assistant Chief of Naval Staff (Air), to date 11th August, 1937; and Captain L. E. Holland, A.D.C., Assistant Chief of Naval Staff, from the same date.

FLAG LIST CHANGES.

Consequent on the vacancy on the Vice-Admirals' list caused by the loan of Vice-Admiral Sir Ragnar M. Colvin, K.B.E., C.B., to the Government of the Commonwealth of Australia on 11th September, Rear-Admiral J. F. Somerville, C.B., D.S.O., was promoted to Vice-Admiral, to date 11th September. Vice-Admiral Somerville was reappointed in command of the Destroyer Flotillas, Mediterranean Fleet, on promotion.

FLAG APPOINTMENTS.

HOME FLEET.—The King has been pleased to approve the appointment of Admiral Sir Charles M. Forbes, K.C.B., D.S.O., to be Commander-in-Chief, Home Fleet, in succession to Admiral Sir Roger R. C. Backhouse, G.C.V.O., K.C.B., C.M.G., to date March, 1938.

CHINA STATION.—The King has been pleased to approve the appointment of Vice-Admiral Sir Percy L. H. Noble, K.C.B., C.V.O., to be Commander-in-Chief, China, in succession to Admiral Sir Charles Little, K.C.B., and to assume command April, 1938.

AFRICA STATION.—The King has been pleased to approve the appointment of Rear-Admiral George H. D'Oyly Lyon, C.B., to be Commander-in-Chief, Africa Station, in succession to Vice-Admiral Sir Francis L. Tottenham, K.C.B., C.B.E., to date 19th February, 1938, and to assume command about 1st April.

CHIEF OF STAFF, PORTSMOUTH.—Rear-Admiral Ralph Leatham was appointed Chief of Staff to Admiral the Earl of Cork and Orrery, G.C.B., G.C.V.O., Commander-in-Chief, Portsmouth, in succession to Rear-Admiral S. St. L. Moore, C.V.O., to date 6th September.

RESERVE FLEET.—Vice-Admiral M. K. Horton, C.B., D.S.O., assumed command of the Reserve Fleet in succession to Vice-Admiral Sir G. C. Dickens, K.C.V.O., C.B., C.M.G., on 26th July. The office of the Vice-Admiral was transferred from H.M.S. "Durban" to H.M.S. "Hawkins" on 21st July.

SECOND BATTLE SQUADRON.—Rear-Admiral L. D. I. Mackinnon, C.B., C.V.O., hoisted his flag in H.M.S. "Resolution" on 18th August, and left Devonport the same day for La Pallice, where he assumed command as Rear-Admiral, Second Battle Squadron, in succession to Rear-Admiral C. G. Ramsey, C.B., and took over the duties of Senior British Naval Officer off the North Coast of Spain. The "Royal Oak" returned to Devonport with Rear-Admiral Ramsey, whose flag was struck on arrival.

YANGTSE.—In view of the situation in China, the appointment of Rear-Admiral R. V. Holt, D.S.O., M.V.O., as Rear-Admiral and Senior Naval Officer, Yangtse, was postponed until November.

AMERICA STATION.—Owing to the illness of Vice-Admiral S. J. Meyrick, C.B., Commander-in-Chief, America and West Indies Station, his flag was struck on 11th August, and Captain (Commodore, 2nd class) H. H. Harwood, O.B.E., Commanding the South American Division, assumed temporary command of the station from that date, with the temporary rank of Commodore 1st class. Commodore Harwood remained in his own ship, H.M.S. "Exeter," which was at the time at San Francisco.

Vice-Admiral Meyrick re-assumed command of the station on 14th September, at New York, when his flag was hoisted in H.M.S. "York."

ADMIRAL-SUPERINTENDENT OF CONTRACT-BUILT SHIPS.—Vice-Admiral St. A. B. Wake, C.B. (retired) has been appointed Admiral-Superintendent of Contract-Built Ships, with effect from 1st December, 1937.

PERSONNEL.

TRAINING OF CADETS.—Their Lordships have decided to reinstate the normal period of training for special entry (Public School) and direct entry (Mercantile Marine) Cadets before joining the fleet as Midshipmen. In September, 1936, among other expedients to increase the numbers of Sub-Lieutenants in the fleet, it was necessary to reduce the period spent by these Cadets in the training cruiser from three terms to two. The longer period is now to be restored, but for the present the first term will be spent in H.M.S. "Excellent," Gunnery School, where the Cadets will be accommodated in H.M.S. "Erebus," turret drill-ship. The

second and third terms will be spent in H.M.S. "Vindictive." Officers will continue to spend two years at sea as Midshipmen.

TRAINING CRUISER.—H.M.S. "Vindictive" relieved H.M.S. "Frobisher" as Cadet training cruiser on 17th August. The "Vindictive" left Portland on 13th September on her first cruise, to the Mediterranean.

COMMISSIONS FROM THE RANKS.—A revised scheme was announced in Fleet Orders dated 2nd September with a view to encouraging promising ratings to attain the professional and educational standards necessary to qualify for commissions as Sub-Lieutenants. The principal feature of the revised scheme is the provision of special training on board ship of selected ratings to bring them up to the educational and professional standard required before final selection. In consequence of this innovation, ratings are now eligible to appear before the Fleet Selection Boards without certain qualifications hitherto necessary; but eligibility to appear before the final Selection Board is to be determined by the results of the educational and seamanship examinations taken on completion of the training course in the selected ship.

ADDITIONAL PROMOTIONS.—Thirteen Acting Petty Officers were promoted to the rank of Acting Sub-Lieutenant to date 1st September, 1937, the highest total since the War. In 1932, there were eight promotions; in 1933, six; in 1934, five; in 1935, three; and in 1936, four. Eight Engine-Room Artificers were promoted to the rank of Acting Sub-Lieutenant (E) to date 1st July, 1937, or double the number so promoted in 1936.

SERVICE IN SUBMARINES.—Volunteer ratings will in the first instance be required to serve in submarines for five years, at the end of which period they will normally be discharged to general service, but if willing to continue serving they may be retained at the discretion of the Rear-Admiral (S) to complete a total of eight years served continuously in submarines. This variation of the normal periods has been approved as a temporary measure to meet manning requirements, and normal arrangements will be resumed when conditions allow.

CONTROLLED MINEFIELD DUTIES.—The enrolment of men for special duties in connection with the preparation and maintenance of controlled minefields and kindred devices was sanctioned in an Order in Council dated 10th August.

OGILVY MEDAL.—The Ogilvy Medal for 1937 has been awarded to Lieutenant P. P. M. Green, who took first place in the qualifying examination for Torpedo Lieutenant in H.M.S. "Vernon."

HOWARD-CROCKETT PRIZES.—Eardley Howard-Crockett Prizes have been awarded to Chief Cadet Captains R. J. G. Macpherson and A. K. Dodds, who passed out of the R.N. College, Dartmouth, in August.

UNIFORM CHANGE.—The collar of the round jacket for Midshipmen, Midshipmen (E), Paymaster Midshipmen, Naval Cadets and Paymaster Cadets is no longer to be fitted with a hook and eye. New purchases are to conform with this revised specification, but round jackets already purchased and fitted with a hook and eye may continue to be worn.

WELFARE DECISIONS.—Further decisions on a large number of the requests put forward at the Review of Service Conditions, 1936, have been promulgated in Fleet Orders. Among the changes made are the following:—

Plain clothes may be worn by C.P.Os and Petty Officers proceeding on leave from and returning to home shore establishments, provided no use is made of Service boats.

In future construction, provision to be made for a separate small galley for Chinese cook ratings.

Inter-Service Government Committee to consider the design of service overalls.

ORGANISATION AND DISTRIBUTION.

MEDITERRANEAN FLAGSHIPS.—During the autumn cruise of the Mediterranean Fleet the flag of the Commander-in-Chief, Admiral Sir Dudley Pound, was flown in H.M.S. "Barham," and that of the Rear-Admiral, First Battle Squadron, Rear-Admiral T. H. Binney, in H.M.S. "Malaya." The arrival on the station of H.M.S. "Warspite" was delayed owing to machinery defects.

ADDITIONAL SHIPS FOR PATROL.—Following the Nyon Conference, H.M.S. "Cairo," flagship of Commodore H. D. Pridham-Wippell, Commanding Home Fleet Destroyer Flotillas, and the 4th Destroyer Flotilla were ordered to the Mediterranean to reinforce the anti-piracy patrol. Most of these ships left the Home Fleet at Invergordon on 14th September and arrived at Gibraltar about a week later.

HOME FLEET FLAGSHIPS.—The flag of the Commander-in-Chief, Home Fleet, Admiral Sir Roger Backhouse, is being flown in H.M.S. "Rodney" during the absence of the "Nelson" for large repairs at Portsmouth.

AMERICA AND WEST INDIES.—H.M.S. "Orion," Captain H. R. G. Kinahan, left Sheerness on 10th August and Devonport on 24th August for Bermuda to join the America and West Indies Station in place of the "Dragon," which returned home to pay off at the end of May.

AFRICA STATION.—H.M.S. "Neptune," Captain J. A. V. Morse, D.S.O., left Devonport on 21st September for Simonstown, where she was due on 16th November to join the Africa Station after visiting a number of West African ports, in place of the "Carlisle," which has reduced to reserve at Devonport.

CHINA STATION.—H.M.S. "Dorsetshire," Captain F. R. Barry, left Devonport on 14th September for the China Station, from which she returned in March last for a long refit.

SURVEYING SERVICE.—H.M.S. "Challenger," Commander E. H. B. Baker, left Portsmouth on 22nd September for surveying service on the America and West Indies Station, and was to proceed to Trinidad.

MOTOR TORPEDO BOATS.—The 1st Motor Torpedo Boat Flotilla under Lieutenant-Commander G. B. Sayer arrived at Malta on 17th July to join the Mediterranean Fleet. The Flotilla left Malta for its first cruise on 19th August, visiting Navarin, Argostoli, and several other ports in the Eastern Mediterranean.

MERCHANT NAVY DEFENCE COURSES.¹

Defence courses for officers of the Merchant Navy began in London, Liverpool, Glasgow and South Shields on 30th August, at Hull and Cardiff on 13th September, and at Southampton later. At each of these ports (except Southampton, where special arrangements have been made) there is an instructional staff comprising a Lieutenant-Commander, known as the Merchant Navy Defence Instructional Officer (short title, M.N.D.I.O.), a Gunner's Mate and a Yeoman of Signals. At Southampton, some of the instruction is being given locally by the Admiralty Liaison Officer and some in H.M.S. "Excellent" at Portsmouth.

¹ A Lecture on this subject will be published in the JOURNAL for February, 1938.

The aim of the courses is to inform the Merchant Navy of the measures that will be taken by the Royal Navy for the protection of seaborne trade in war, and to make known to Masters and officers of merchant ships the part that they must play if the maximum possible degree of safety to their ships is to be ensured. A complete defence course comprises ten three-hour sessions, from 9.30 a.m. to 12.30 p.m. and from 2 p.m. to 5 p.m. on Monday to Friday inclusive, but it is not necessary for the course to be taken continuously. Sessions can be taken separately at any time convenient to the officer, in any order, and at any port convenient to him. To allow for ships on routine runs which are only in port on certain days of the week, and also for officers who can attend on forenoons or afternoons only, the arrangement of sessions in the week will be varied.

The courses are open to all Masters and navigating officers of British nationality, other than those in the R.N.R., who already have some training in these matters and who will usually be withdrawn from merchant ships in time of war.

MATERIAL.

1937 PROGRAMME.—The battleships of this programme were laid down as follows :—

"Anson," by John Brown & Co., Ltd., Clydebank, on 5th May, 1937.

"Jellicoe," by Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne, on 20th July.

"Beatty," by Fairfield Shipbuilding and Engineering Co., Ltd., on 1st June.

The aircraft carriers of the programme are :—

"Formidable," by Harland & Wolff, Belfast, laid down on 17th June.

"Indomitable," by Vickers-Armstrongs, Barrow, ordered 6th July.

Contracts for the construction of three submarines of the programme were awarded in July as follows :—

"Thistle," to Vickers-Armstrongs, Ltd., Barrow-in-Furness.

"Taku," to Cammell, Laird and Co., Ltd., Birkenhead.

"Tarpon," to Scotts' Shipbuilding and Engineering Co., Ltd., Greenock.

Contracts for the two river gunboats "Dragonfly" and "Grasshopper" were placed in August with Messrs. John I. Thornycroft and Co., Ltd., Woolston, Southampton.

Contracts have also been awarded for the boom defence vessels of the 1937 programme.

1936 PROGRAMME.—The aircraft carriers of this programme were laid down :—

"Illustrious," by Vickers-Armstrongs, Ltd., Barrow, on 27th April, 1937; and "Victorious," by Vickers-Armstrongs, Ltd., High Walker, on 4th May, 1937.

The first of the "Dido" class cruisers, 1936 programme, have been laid down as follows :—

"Naiad," Hawthorn, Leslie and Co., Ltd., Hebburn-on-Tyne, on 26th August.

"Phoebe," Fairfield Shipbuilding and Engineering Co., Ltd., Govan, on 2nd September.

The following destroyers of the Second Tribal Flotilla have been launched :—
"Eskimo" and "Mashona," Wallsend-on-Tyne, on 3rd September; "Somali," Wallsend-on-Tyne, on 24th August; "Matabele," Greenock, on 6th October
"Tartar," Wallsend-on-Tyne, on 21st October; "Ashanti," Dumbarton, on 5th November.

The escort vessel of the 1936 programme building by Messrs. Denny and Bros., Dumbarton, is to be named "Auckland" instead of "Heron" as previously announced. She is being fitted as a surveying vessel, and the change of name possibly foreshadows the locality of her employment.

The first submarine of the programme, H.M.S. "Undine," was launched at Barrow-in-Furness on 5th October.

1935 PROGRAMME.—The nine destroyers of the "Intrepid" class have been completed with the exception of the "Impulsive" and have proceeded to the Mediterranean to join the 3rd Flotilla.

Destroyers of the First Tribal Flotilla, authorised in the 1935 Supplementary Estimate, have been launched as follows :—

"Afridi" and "Cossack," by Vickers-Armstrongs, Walker-on-Tyne, on 8th June.

"Gurkha," by Fairfield Shipbuilding Co., Ltd., Govan, on 7th July.

"Maori," by Fairfield Shipbuilding Co., Ltd., Govan, on 2nd September.

"Zulu," by A. Stephen and Sons, Ltd., Govan, on 23rd September.

"Mohawk," by Thornycroft and Co., Ltd., Woolston, on 5th October.

The submarine "Sterlet" was launched at Chatham Dockyard on 22nd September, and will complete the class of twelve of the "Swordfish" type.

The "Triton," first of a new class of patrol submarines, was launched by Vickers-Armstrongs, Barrow, on 5th October.

The escort vessels, minesweepers and patrol vessels of this programme have all been launched, and should be completed by about the end of the year.

1934 PROGRAMME.—H.M.S. "Glasgow" commissioned at Greenock on 8th September for acceptance trials and service in the Second Cruiser Squadron, Home Fleet, and arrived at Portsmouth on the 11th. H.M.S. "Sheffield" commissioned at Walker-on-Tyne on 25th August, and arrived at Sheerness next day for service in the same squadron. In October the "Sheffield" visited Immingham, the nearest convenient port to the City of Sheffield, to allow the inhabitants to visit her, and to receive presentations.

H.M.S. "Birmingham," due for completion about 18th November, is to proceed to the China Station instead of to the 2nd Cruiser Squadron as originally ordered.

MISCELLANEOUS.

"VERNON" PIERS.—The "Donegal" and "Marlborough" Piers in the "Vernon" establishment have been renamed "Vernon (North)" and "Vernon (South)" Piers respectively. The former names were those of two of the hulks which formed part of the "Vernon" establishment until it was moved on 1st October, 1923, to new shore buildings on what was formerly the site of the Gunwharf.

U.S. MEMORIAL AT GIBRALTAR.—The memorial archway leading to the seafront at Gibraltar, erected by the American Battle Monuments Commission to commemorate the association of the British and United States Navies in the adjacent waters during the War, was dedicated on 6th October. Admiral A. D. Fairfield, U.S.N., in the cruiser "Raleigh," was present at the ceremony.

JELlicoe MEMORIALS.—The memorial to the late Admiral of the Fleet Earl Jellicoe which has been placed in the Church of St. Barbara at Whale Island by Gunnery Officers, past and present, was unveiled by the Countess Jellicoe on 9th

September and dedicated by the Chaplain of the Fleet, the Ven. Archdeacon A. D. Gilbertson.

On 11th August, Princess Beatrice, Governor of the Isle of Wight, unveiled a memorial to Lord Jellicoe in St. Boniface's Church where he attended when residing at St. Lawrence Hall, Ventnor. Guards of honour were furnished by H.M.S. "Iron Duke."

NAVY WEEK.

ADMIRALTY THANKS.—On 10th August, the Admiralty sent the following message to the Commanders-in-Chief of the Home Ports and Home Fleet and the Vice-Admiral Commanding Reserve Fleet :—

" Their Lordships wish to express to the officers and men under your command their appreciation of the good work they have done to make Navy Week such a success. It is particularly gratifying that in spite of the exceptionally hot weather the drop in the total attendance was so small. Their Lordships recognise that this is due to the excellent organization of the Navy Week Committees, and the hard work of all those officers, retired officers, and men who, in their spare time, assisted them to such good effect."

FLEET AIR ARM

NORTH SEA EXERCISE.—During the passage of part of the Home Fleet to Scottish waters on its autumn cruise in the first week of September, opportunity was taken for certain units of the R.A.F. to co-operate in exercises at sea. These units were No. 209 (G.R.) Squadron, from Felixstowe; a composite squadron drawn from Nos. 210 and 228 (G.R.) Squadrons, Pembroke Dock, which operated from Hornsea Mere, Yorkshire; Nos. 206 and 217 (G.R.) Squadrons, from Bircham Newton, King's Lynn; No. 269 (G.R.) Squadron, from Abbotsinch, Paisley; and No. 233 (G.R.) Squadron, from Thornaby, Yorks. This was the first occasion on which these squadrons had taken part in an extensive exercise with naval units.

ANTI-PIRACY PATROL.—Following the despatch of Nos. 209 and 210 (G.R.) Squadrons, R.A.F., to co-operate in anti-piracy patrol duties in the Mediterranean, H.M.S. "Cyclops," parent ship of the 1st Submarine Flotilla, was detached to act as their depot-ship at Arzeu, in Algeria. Commander G. L'E. M. Sturges, R.N., was appointed to the "Cyclops" for observer and staff duties with headquarters, No. 1 (G.R.) Wing, R.A.F.

ROYAL NAVAL VOLUNTEER RESERVE

LONDON NAVY WEEK.—Navy Week of the London R.N.V.R. Division was held on board H.M.S. "President" at Blackfriars from 28th August to 5th September, inclusive, to show the facilities offered for naval volunteering in London and also to aid naval charities. The opening ceremony was performed by the Lord Mayor.

NEW SHIP.—The sloop "Chrysanthemum" is to be converted for use as an overflow ship for the London Division. She was paid off into dockyard control at Devonport on 7th May, 1937, after serving for many years as target-towing and marking ship in the Mediterranean.

SUPPLEMENTARY RESERVE.—Nearly a thousand members have been enrolled in the R.N.V.R. Supplementary Reserve, the creation of which was announced a year ago.

Candidates for this force must be between the ages of 18 and 39. They hold no rank until they are granted temporary commissions on mobilisation.

DOMINION NAVIES

ROYAL AUSTRALIAN NAVY

FIRST NAVAL MEMBER.—With the approval of the Federal Cabinet, the Admiralty have appointed Vice-Admiral Sir Ragnar M. Colvin, K.B.E., C.B., to be lent for duty as First Naval Member of the Commonwealth Naval Board, to date 11th September. Sir Ragnar Colvin was due to arrive at Melbourne on 1st November.

DEATH OF SIR FRANCIS HYDE.—Admiral Sir G. Francis Hyde, K.C.B., C.V.O., C.B.E., First Naval Member since October, 1931, died in Melbourne on 28th July at the age of 60. He began his career in the Merchant Navy, became a Midshipman, R.N.R., in 1896, and Lieutenant in 1902. After he had served five periods of training with the Royal Navy, he was permitted to transfer to that service in 1905 with his original seniority. On the establishment of the Australian Navy in 1911 he was appointed Commander (D) in the new force, and in the War served in H.M.A.S. "Australia," in command of H.M.S. "Adventure," in the Mercantile Movements Division of the Naval Staff at the Admiralty, and as Senior Naval Officer at Holyhead. He commanded H.M.S. "Vindictive" from 1924, was Commodore of the Australian Squadron in 1926-29, and Rear-Admiral Commanding 3rd Battle Squadron in 1930-31. Sir Francis was the first member of the Australian Navy to become an Admiral.

COMMODORE THOMSON.—Captain G. P. Thomson, O.B.E., R.N., Second Naval Member, was appointed Acting First Naval Member of the Commonwealth Naval Board on the death of Sir Francis Hyde, with the rank of Commodore, second class.

ROYAL CANADIAN NAVY

DESTROYERS SCRAPPED.—The destroyers "Champlain" and "Vancouver" have been scrapped on relief by the destroyers "Fraser" and "St. Laurent" (formerly the "Crescent" and "Cygnet" in the Royal Navy).

CRUISES.—The "Saguenay" and "St. Laurent" (Eastern Sub-Division), made short cruises in September to Lunenburg and St. John, New Brunswick, and on her return to Halifax met H.M.S. "Scarborough" after a cruise to Hudson Bay ports.

The "Skeena" and "Fraser" (Western Sub-Division) made a cruise from Esquimalt in September to Nanoose and Vancouver.

NEW ZEALAND DIVISION, ROYAL NAVY

H.M.S. "LEANDER."—The cruiser "Leander," Captain J. W. Rivett-Carnac, D.S.C., left Devonport on 2nd July to join the New Zealand Division in place of the "Dunedin," and proceeding via the Panama Canal arrived at Auckland on 18th August. On 4th October she began a two months' cruise to ports in the Dominion.

COMMISSION FROM LOWER DECK.—Petty Officer Thomas Ian Harray, who was promoted to commissioned rank in the Royal Navy as Acting Sub-Lieutenant from 1st September, is the first rating from the New Zealand Division to gain a commission in this way. After serving in ships on the station, he came to England early in 1936 for further training, and has recently served in the battleship "Ramillies."

CEYLON NAVAL VOLUNTEER RESERVE

Provision has been made by the Ceylon Legislature for the creation of a force for the local defence of the Island to be called the Ceylon Naval Volunteer Force.

The Government of Ceylon is empowered to maintain and use vessels of war at the expense of the colony. The King's approval for the measure was notified in the *London Gazette* on 10th August, 1937.

FOREIGN NAVIES

ARGENTINA

NAMES OF WARSHIPS.—The Ministry of Marine have adopted a regular system for naming warships: armoured cruisers will be named after men prominent in the history of Argentine emancipation; cruisers after Argentine naval heroes; torpedo-boats after Provinces and national territories; submarines after inland Argentine celebrities; minelayers after naval officers who distinguished themselves in the wars of independence; gunboats after Argentine river ports or naval actions; transports after towns on the sea coast; auxiliary vessels after naval officers who lost their lives in the discharge of duty; tugs after Indian tribes; and smaller craft after fish and sea-birds.

NEW CONSTRUCTION.—The minesweepers "Parker" and "Spiro" were launched from Argentine yards in the early part of this year. The latter is the fifth sloop to be launched in that country. Two further vessels, the "Robinson" and "Seaver," are building. These vessels all displace 550 tons, carry an armament of two 4-in. guns and have a speed of 16 knots. Their complement is six officers, six "non-commissioned officers," and fifty petty officers and men.

DENMARK

NEW CONSTRUCTION.—The building programme for the next six years includes three submarines, three torpedo-boats, one minelayer, three minesweepers, three speed boats, one inspection ship, and one survey ship; one more submarine is to be laid down before the end of that period. During these six years the fleet will consist of the coast cruiser "Niels-Juel," thirteen small craft and one minelayer. When the "Niels-Juel" is struck off the effective list there will be in service eight torpedo-boats, four submarines, one minelayer and three minesweepers, one survey ship and one repair vessel.

The age limit for cruisers has been fixed at twenty-four years, for torpedo boats eighteen, and for submarines sixteen years.

FRANCE

COMPARISON BETWEEN FRENCH AND ITALIAN NAVIES.—A report of an interview given by Monsieur Pietri to a representative of *Le Figaro* contains an interesting comparison made by him of the French and Italian fleets. He said:—

"For the moment, excluding light cruisers of which Italy possesses one or two units more than we do, we are superior to her in all other categories. In the matter of capital ships, notably, Italy is much inferior, as she has only just launched the "Vittorio-Veneto," and she has her four old battleships undergoing modernization. We have, ourselves, in full commission, and not counting the old "Courbet" class, our three "Lorraines," which are very powerful and useful units; the "Dunkerque," which has been in service since April, and shortly the "Strasbourg" if work on her is not retarded by strikes and the law of the 40-hour week. . . ."

"The *"Richelieu,"* which is under construction at Brest, and the *"Jean-Bart"* at St. Nazaire, can and must be ready for service, the former in 1939, and the latter in 1940. At that time we shall possess a battle fleet of 187,000 tons (124,000 modern and 63,000 modernized) against, in Italy, about 142,000 tons (70,000 modern and 72,000 modernized) . . ."

SALE OF AN OLD BATTLESHIP.—The old battleship *"Diderot"* was sold at Brest on 30th July for 3,557,010 francs to the firm of Gosselin-Duriez, presumably to be broken up. The *"Diderot"* was a ship of 18,592 tons, built in 1911. She carried four 12-in. and twelve 9.4-in. guns and had a speed of 19 knots. She and her two sisters, the *"Condorcet"* and *"Voltaire,"* were more or less contemporaries of our *"Lord Nelson"* and *"Agamemnon."*

NEW CONSTRUCTION.—The 7,600 ton cruiser *"Montcalm"* has completed her trials. Her sister ship the *"Gloire"* was also due to complete trials during the autumn. These two ships and the *"Georges-Leygues"* are due to join the Atlantic Squadron on commissioning. They will probably form a Fourth Cruiser Division. According to present arrangements the three cruisers are due to carry out an endurance cruise round Africa in the New Year.

Another ship of the class, the *"Jean de Vienne,"* was due to join the Third Cruiser Division in September.

It is interesting to note that the six ships of this class are the first vessels in the French Navy to which the new regulations regarding trials will apply; under these less importance will, in future, be attached to full power trials and more to endurance. It is known, however, that all six cruisers have largely exceeded their designed speed.

It is understood that there is no question of a long-term programme of naval construction being introduced during the current year, and it is unlikely that there will be a supplementary programme for 1937. New construction will continue to be laid before Parliament in the form of annual programmes.

The following vessels of the 1937 programme have been allocated to the under-mentioned shipbuilding yards:—

Cruiser.—*"De Grasse,"* to the Brest Arsenal.

Destroyers.—*"Le Filibustier"* and *"Le Corsaire,"* to the Forges de la Méditerranée, La Seyne.

Submarine.—*"Emeraude,"* to Toulon Arsenal.

Sloop-Minesweepers.—*"La Curieuse," "La Batailleuse," "Annamite"* and *"Bambara,"* to Lorient Arsenal.

1st-Class Submarine.—*"La Praya,"* to Cherbourg Arsenal.

AUTOGIRO TRIALS.—It is reported that trials have been carried out with two autogiros to test the value of this type of aircraft for naval use. They were conducted from the carrier *"Béarn"* and included landing-on tests.

GERMANY

NEW CONSTRUCTION.—According to an article by Commander Giese, which appeared in the *Boersen Zeitung*, there is to be no change of building plans which will affect the total tonnage to be brought into service by 1941. By that date the fleet will consist of five battleships, three armoured ships of the *"Deutschland"* class, two aircraft carriers, fourteen cruisers, forty destroyers and torpedo-boats and about 23,000 tons of submarines.

Of the battleships, two of 26,500 tons have been launched, two of the 35,000-ton type are on the slips, and a fifth of which details have not yet been published, has yet to be laid down.

The first of the two aircraft carriers was laid down in 1936; the second carrier is due to be laid down shortly.

Of the fourteen cruisers six are in commission—all vessels of 6,000 tons, armed with nine 5.5-in. guns, except the "Emden," which is slightly smaller; three 10,000-ton cruisers are building and will be armed with eight 8-in. guns.

According to a Press report, the second and third vessels of the 1,625-ton type of destroyers "Erich Giese" and "Max Schulz" have carried out very satisfactory trials. These craft are reputed to be able to stand up well to rough seas. The first Division will soon be ready for service.

NAVAL ATTACHÉ.—Rear-Admiral Wassner who had been Naval Attaché in London since 1933, and was shortly to have been relieved in that appointment, died suddenly from heart failure at The Hague on 25th August. Admiral Wassner was a successful submarine commander in the War, and was awarded the highest German war decoration "Pour-la-Merite." He has been succeeded by Captain Leopold Siemens.

ITALY

NEW BATTLESHIPS.—The battleship "Littorio" was launched on the 22nd August at the works of Ansaldo, Genoa, in the presence of the King of Italy and a large gathering of statesmen and officials. The "Littorio," like her sister-ship the "Vittorio Veneto," will displace 35,000 tons and carry nine 15-in. guns in triple turrets, one forward and two aft, and have a speed of 31 knots. The secondary battery will consist of twelve 6-in. guns in six turrets, three on each side; and the A.A. armament will be twelve 4-in. and twenty smaller guns or machine guns. The main armour will be 9 to 10 ins. thick. It is also reported that each ship will have one or two catapults and carry four aeroplanes. These ships were laid down at the end of October, 1934, but work on them practically ceased during the Abyssinian crisis. Normally they would have taken about two years to complete.

Nothing further seems to have been done towards laying down two more capital ships, which Signor Mussolini announced as one of the earliest reactions to the publication of the British rearmament programme.

MODERNIZED BATTLESHIPS.—The old battleships "Cavour" and "Cesare," which underwent extensive modernization, details of which were published in the JOURNAL of November, 1936, have now joined the first Squadron. This also includes the seven 8-in. cruisers, and is based on Taranto.

NEW SUBMARINES.—According to a Press report, twenty new submarines have been, or will be put in hand during 1937, and when these are completed Italy will have 108 underwater craft, of which more than 40 per cent. will have been built since 1st January, 1935. Unless the programmes of other naval Powers are increased before then, this will be the largest number of modern submarines possessed by any country.

CONDEMNED SHIPS.—The old cruisers "Pisa," "Ancona" (ex-German "Graudenz"), "Libia," "Brindisi" (ex-"Helgoland"), "Venezia" (ex-"Saida"), the sloop "Campania," and the leader "Ardente" have been placed on the non-effective list on the score of old age.

JAPAN

NAVAL POLICY.—Early this year Admiral Youai, Minister of Marine, stated that no naval armament programme that might menace other countries was contem-

plated. He also emphatically denied a report that it was proposed to construct ver large battleships with guns of a greater calibre than 16-in.

NETHERLANDS

NEW CONSTRUCTION.—The naval estimates for 1938 make provision for a fourth cruiser and one torpedo motor boat. It is expected that the construction of the cruiser will take about three years.

NAVAL AVIATION.—The Naval Air Force is an important factor in the defence of the Netherlands East Indies, and seaplanes are extensively employed in reconnoitring the waters of New Guinea and the Netherlands archipeligo. They are specially useful in supervizing the fisheries.

NORWAY

MERCHANT FLEET.—Norway occupies fourth place in the world's merchant tonnage, and at the end of last year her merchant fleet consisted of 1,377 steamers with a tonnage of 1,950,000; 480 motor ships of 2,100,000 registered tons; and two sailing ships. 12.6 per cent. of the ships are under five years old, and 51.1 per cent. by tonnage are motor ships. The tanker fleet included 45 steamers and 164 motor ships with a total tonnage of 1,457,727.

SPAIN

GOVERNMENT NAVY

HEADQUARTERS.—The Political Commissar of the Republican Fleet has taken up his headquarters at Cartagena naval base; subordinate delegates are being appointed to the various departments.

DEFENCE FLOTILLA.—A Coastguard and Submarine Defence Flotilla has been formed at Almeria. This is an independent unit working under the direct orders of the Minister of Marine. There are similar flotillas at Barcelona and Catalonia.

GENERAL FRANCO'S NAVY

The balance of strength between the rival navies in Spanish waters has been appreciably upset in favour of General Franco by the fall of Gijon; in order to prevent their falling into the Insurgents' hands, the crews of the destroyers "Circar" and "Jose Luis Diez," torpedo-boat No. 3, and submarine C6, scuttled their ships; they escaped to France.

A NEW "ESPAÑA."—Lists of subscriptions have been published both in the Government and Insurgent newspapers for the purchase of a new "España" to replace the battleship which was sunk last April through striking a mine. Apparently both sides propose to acquire a new ship of the same name.

UNITED STATES

NEW BATTLESHIPS.—The United States Government have now declared that, in view of the absence of universal acceptance by the "Washington" Powers of the limitation of gun calibre, they have reluctantly found themselves obliged to mount 16-in. guns in their two new capital ships, the "Washington" and "North Carolina."

Tenders for these ships were called for from private firms, but the bids were much too high and have all been rejected. They will be built in navy yards.

The Navy Department is asking Congress to provide funds in the 1939 fiscal year for the construction of two further battleships which, it is proposed, should be completed by 1941; the cost is expected to exceed 60,000,000 dollars. These

four new ships will replace the "Arkansas," the "New York," the "Texas," and the "Nevada."

NEW CRUISERS.—Congress is to be asked to provide funds for the construction of two light cruisers in the new programme, but no details are yet available as to their design.

Of the nine 10,000-ton cruisers armed with 6-in. guns now under construction, the "Philadelphia" and the "Brooklyn" are due for completion by the end of this year; the "Savannah," "Nashville," "Phoenix," "Boise" and "Honolulu" in the course of 1938; and the "St. Louis" and "Helena" in 1939.

NEW AIRCRAFT CARRIER.—The aircraft carrier "Yorktown," of 19,900 tons and capacity for carrying seventy-five aeroplanes, has started her trials, but trouble has been experienced due to excessive vibration and noise. The ship is due to join the fleet early next year. Her aircraft will be organized in four squadrons which will include fighters, observation-scouting, torpedo-bomber, and dive-bomber types.

AVIATION CADETS.—The first class of Aviation Cadets for the year 1937-38 started at the Naval Air Station at Pensacola at the end of July. This will be the third season for this system of training, which was introduced in 1935 to meet the demands for pilots consequent on the rapid expansion of the Naval Air Service.

These Cadets are enlisted as Seamen 2nd class in the Volunteer Reserve, and are sent to one of the Naval Reserve Aviation Bases for one month's elimination flying training; on qualifying they are appointed Aviation Cadets and sent to Pensacola for a 12 months' pilot's course. Naval "indoctrinal" training is given in destroyers and other craft. On passing out, the Cadets go to the fleet for three years' aviation duty, after which they revert to civil life with a commission as Ensign and a gratuity of £300.

In 1935-36, out of 778 candidates who were accepted, 494 completed the eliminating course satisfactorily; of these about 300 qualified as "Naval Aviators." In 1936-37, 315 Cadets were trained at Pensacola, of whom it is estimated that 226 will pass out. In 1937-38 about 450 Cadets will be trained, of whom about 315 are expected to qualify.

Applicants are of a very high standard, mainly University or College graduates. The scheme is intended to remain in force for five years only. It appears to be providing a large number of trained pilots in a short time and also to be building up a good flying reserve. Aviation Cadets rank between Warrant Officers and Ensigns.

NAVAL RESERVES.—A gradual increase in the Naval Reserve, which will eventually provide for 300,000 trained men to supplement the officer and enlisted-men strength of the regular Navy in time of war, has been approved by the President.

The present reserves consist of the Fleet Naval Reserve of 1,200 officers and 24,000 enlisted men; the Merchant Marine Naval Reserve of 3,400 officers and no men; and the Volunteer Naval Reserve of 2,300 officers and 10,000 men: in all about 7,000 officers and 34,000 enlisted men. The new scheme is intended to attract boys of high-school and college age, and give them training without pay, but with all expenses paid. The training period will be a month or six weeks during the summer.

NAVAL AVIATION.—A sum of 49,500,000 dollars has been allocated in the 1937-38 Navy Appropriation Bill to naval aviation. Of this 27,186,000 dollars is earmarked for new construction, equipment, spare parts and accessories. The Bill also allows the Secretary of the Navy, prior to July, 1938, to contract for 15,000,000 dollars worth of new aircraft in addition to the amount set aside for similar purchases.

ARMY NOTES

HIS MAJESTY THE KING.

PRESENTATION OF COLOURS.—Her Majesty the Queen presented Colours to the 2nd Battalion, The Black Watch (Royal Highland Regiment) on 14th September, 1937, at Balmoral Castle. The Queen, who is Colonel-in-Chief of the Regiment, was attended by the Lady Hyde and General Sir Archibald Cameron (Colonel of the Regiment). After presenting the Colours, Her Majesty addressed all ranks of the battalion present on parade. Lieutenant-Colonel A. K. Mcleod, Commanding Officer, replied and the ceremony closed with the Colours being dipped in Salute. The battle honours on the flags were then explained to Her Majesty by Sir Archibald Cameron.

The Consecration Service for the new Colours was held on the Sunday following at Maryhill Barracks, Glasgow, where the 2nd Battalion was quartered.

The Regiment later sailed for Palestine, where it has come under the orders of Major-General A. P. Wavell, G.O.C. British Forces in Palestine and Trans-Jordan.

THE LONDON SCOTTISH.—The Queen inspected the London Scottish, The Gordon Highlanders, a regiment of which she is the Honorary Colonel, on 16th October, 1937, at Buckingham Palace. Her Majesty was attended by H.R.H. Princess Arthur of Connaught and by General Sir Ian Hamilton, Colonel, The Gordon Highlanders. The battalion paraded at full strength under the command of Lieutenant-Colonel L. D. Henderson, M.C., T.D., 685 officers and men being present.

After the Queen had inspected the regiment, which was drawn up in line, Colonel Henderson called for "three hearty cheers for Her Majesty." The battalion then marched past headed by the pipers. The ceremony over, the Queen congratulated Colonel Henderson on the excellence of the parade, which, as he is due to retire shortly after 35 years service in the Regiment, will be his last.

AIDES-DE-CAMP GENERAL.—His Majesty has been pleased to approve the appointment of General Sir Edmund Ironside, K.C.B., C.M.G., D.S.O., and General Sir Walter Kirke, K.C.B., C.M.G., D.S.O., as Aides-de-Camp General to the King.

AIDES-DE-CAMP TO THE KING.—His Majesty has been pleased to approve the appointment of Colonel (temporary Brigadier) R. Evans, M.C., and Colonel (temporary Brigadier) E. F. Norton, D.S.O., M.C., as Aides-de-Camp to the King.

COLONELS OF REGIMENTS.—His Majesty the King has been pleased to approve the appointment of Colonel (honorary Brigadier-General) H. H. S. Morant, D.S.O., as Colonel of The Durham Light Infantry, in succession to Major-General C. C. Luard, C.B., C.M.G., who has attained the age limit.

The appointment of Major-General Sir John H. Davidson, K.C.M.G., C.B., D.S.O., as Colonel Commandant, 2nd Battalion, The King's Royal Rifle Corps, in succession to Major-General Sir Steuart W. Hare, K.C.M.G., C.B., who has attained the age limit, is approved by His Majesty.

REGIMENTAL ALLIANCES.—The King has been pleased to approve of the Transvaal Horse Artillery, Union of South Africa Defence Forces, being allied to the Honourable Artillery Company.

The King has also been pleased to approve that the alliances between the 10th Brant Dragoons, Non-Permanent Active Militia of Canada, and the 5th Royal Inniskilling Dragoon Guards and between the 2nd Dragoons, Non-Permanent Active Militia of Canada, and the Royal Scots Greys (2nd Dragoons) may be continued to the 2nd/10th Dragoons, Non-Permanent Active Militia of Canada, formed by the amalgamation of the 2nd and 10th Brant Dragoons, by that regiment's alliance to the 5th Royal Inniskilling Dragoon Guards and the Royal Scots Greys (2nd Dragoons).

HOME

APPOINTMENTS.

The following are announced :—

General Sir W. H. Bartholomew, K.C.B., C.M.G., D.S.O., to be G.O.C.-in-Chief Northern Command.

Lieutenant-General Sir I. L. B. Vesey, K.C.B., K.B.E., C.M.G., D.S.O., to be Chief of the General Staff, India.

Lieutenant-General Sir J. E. S. Brind, K.C.B., K.B.E., C.M.G., D.S.O., to be G.O.C.-in-Chief, Southern Command, India.

Lieutenant-General Sir R. C. Wilson, K.C.B., D.S.O., M.C., to be Adjutant-General in India.

Lieutenant-General Sir S. F. Muspratt, K.C.B., C.S.I., C.I.E., D.S.O., to be Military Secretary, The India Office.

Major-General H. M. Wilson, C.B., D.S.O., to be Commander, 2nd Division ; to date from 19th August, 1937.

General Wilson served in the South African War, 1900-02, and in France and Belgium, 1915-18 ; for his services he was awarded three mentions in despatches and the Brevet of Lieutenant-Colonel ; he joined the Rifle Brigade in 1900, and is now 56 years of age. He has had special experience in training young officers, having acted as Adjutant of an O.T.C. and as Company Commander, and later G.S.O.2 at the Royal Military College, Camberley. His last appointment was Commander, 6th Infantry Brigade, Aldershot Command, which was the first infantry formation to be mechanized entirely.

Major-General the Viscount Gort, V.C., C.B., C.B.E., D.S.O., M.V.O., M.C., to be Military Secretary, The War Office, from 24th September, 1937, with local rank of Lieutenant-General.

General the Viscount Gort's last appointment was at the Staff College, Camberley, where he had been in command for about eighteen months. He joined the Grenadier Guards in 1905, at the age of nineteen, and saw active service in France and Belgium, where he was wounded three times. He won the V.C. for "most conspicuous bravery, skilful leading and devotion to duty" while in command of the 1st Battalion, Grenadier Guards, in the attack on 27th September, 1918, near Flesquieres. Although twice wounded in the assault and suffering severely from loss of blood, he insisted on directing the battalion until he saw the "success signal" go up.

Brigadier Sir R. F. Adam, Bart., D.S.O., O.B.E., to be Commandant, the Staff College, Camberley, with the temporary rank of Major-General, from 24th September, 1937.

Brigadier Sir Ronald Adam served in France, Belgium and Italy during the Great War, and was awarded three mentions in despatches. He joined the Royal Artillery in 1905, at the age of twenty, and was promoted Brevet Lieutenant-Colonel about eleven years ago. He has held numerous Staff appointments, including Brigade Major, R.A.; General Staff Officer, The War Office; Deputy-Director of Military Operations; and his last appointment was Commander, Royal Artillery, Aldershot Command. He has served on the Joint Planning Committee of the three Services in Whitehall.

Major-General W. P. MacArthur, D.S.O., O.B.E., M.D., D.Sc., F.R.C.P., F.R.C.P.I., Honorary Physician to the King, to be Director-General, Army Medical Services, with effect from 1st March, 1938.

Major-General W. Green, C.B., D.S.O., to be Commander, South-Western Area, Southern Command; from about December, 1937. By a coincidence, General Fortune, the previous Commander of this area, who has been promoted, and General Green both served together in the Black Watch (Royal Highland Regiment).

Major-General D. F. Anderson, C.M.G., D.S.O., to be Major-General in charge of Administration, Eastern Command, with effect from 30th March, 1938.

Major-General E. A. Beck, D.S.O., to be Director of Personal Services, The War Office; from 16th January, 1938.

PROMOTIONS.

TO BE GENERAL.—Lieutenant-General Sir Charles Bonham-Carter, K.C.B., C.M.G., D.S.O.; Governor and C-in-C., Malta.

Lieutenant-General Sir George A. Weir, K.C.B., C.M.G., D.S.O.; G.O.C. The British Troops in Egypt.

Lieutenant-General Sir Charles P. Deedes, K.C.B., C.M.G., D.S.O.; late Military Secretary at the War Office.

TO BE LIEUTENANT-GENERAL.—Major-General M. G. Taylor, C.B., C.M.G., D.S.O., in charge of Administration in the Aldershot Command.

Major-General B. D. Fisher, C.B., C.M.G., D.S.O., Commandant of the Royal Military College, Camberley.

TO BE MAJOR-GENERAL.—Brigadier C. E. Edward-Collins, C.B., C.I.E., Deputy Director of Supplies and Transport, A.H.Q., India.

Brigadier P. J. Mackesy, D.S.O., M.C., Commander, 3rd Infantry Brigade; Brigadier D. F. Anderson, C.M.G., D.S.O., Deputy Director of Military Operations and Intelligence, The War Office.

Brigadier F. P. Nosworthy, D.S.O., M.C., Commander, 5th Infantry Brigade.

The distribution of these promotions by arms and services is as follows: Royal Engineers, 3; Infantry, 3; Cavalry, 2; and I.A., one.

The average age of the four promotions to Major-General is fifty-two and a half years.

Colonel Hon. H. R. L. G. Alexander, C.S.I., D.S.O., M.C., A.D.C., Commander, the Nowshera Brigade, India.

Major-General Alexander, who is only 46 years of age, served in the Irish Guards and is a graduate of both the Staff College and the Imperial Defence College.

He is almost the youngest officer now serving to be promoted Major-General since the War, yielding only to Major-General W. G. Holmes, D.S.O., Commander, 8th Infantry Brigade, who is about a year younger.

GENERAL.

DIRECTORATE OF PUBLIC RELATIONS.—A Directorate of Public Relations has been created in the War Office. The function of this new organization, which will serve directly under the Secretary of State and into which the existing Information Section is to be absorbed, will be to promote a closer mutual understanding between the Army and all sections of the civil life of the country. Brigadier A. G. C. Dawnay, C.B.E., D.S.O., at present Army Instructor at the Imperial Defence College, has been selected for the appointment of Director of Public Relations with the local rank of Major-General.

General Dawnay, who is 49 years of age, served in the Coldstream Guards and graduated at the Staff College and Imperial Defence College. He was educated at Eton and Magdalen College, Oxford, where he took an M.A. degree. He acted as Controller, Programme Division, B.B.C., 1933-35, and lately has vacated the appointment of Officer Commanding, Irish Guards Regiment and Regimental District.

At a Press conference held early in October at the War Office, General Dawnay explained the broad outline of the new organization's functions. The aim of the Secretary of State for War and the Army Council, he stated, was not only to make the Army an increasingly efficient instrument, but also a more attractive profession, well able to stand comparison with the alternative careers open to young men. This applied not only to the Regular Army, but also to the Territorials, whose voluntary service and patriotism, he declared, should be more widely recognized.

RECRUITING.—Mr. Hore Belisha, Secretary of State for War, has announced various measures which are to be initiated with a view to improving recruiting in the Regular Army.

Serving soldiers nearing the end of their Colour Service will be allowed to extend their service and reservists of sections "A" and "B" to rejoin the Colours, if they wish. All such men, on completion of twelve years Colour Service, will be eligible to re-engage to complete twenty-one years service, so as to qualify for pension.

Two advantages are claimed for this experiment: firstly, it will show the extent to which serving soldiers and reservists¹ are desirous of availing themselves of the opportunity of adopting the Army as a career; and secondly, the extent to which it is accepted will increase the number of soldiers serving with the Colours.

Furthermore, the age-limit for recruits has been raised from 25 to 28 years.

VOCATIONAL TRAINING.—As an experimental measure during the next six months all soldiers of good character and at least six years service, who have not had a chance of being trained in a trade during their Army service, will have the opportunity of being trained in suitable trades during the last six months of their service on army rates of pay. This training will be given partly at Army Vocational Training Centres at Aldershot, Chiseldon and Hounslow, and also at certain Government Training Centres which are being specially reserved for soldiers. These are Southampton, Handsworth (Birmingham), Slough, Waddon (Croydon), and part of the Centre at Leeds. During the next six months it is hoped to pass 6,000 men through the centres, as compared with 3,000 normally trained in a full year at Army Centres.

¹ According to the latest figures, over 3,000 reservists have availed themselves of the invitation to rejoin the Colours.

THE MOBILE DIVISION.—The War Office has announced that the Headquarters of the Mobile Division are to be formed during this autumn, and will be located in the Southern Command. The 2nd Cavalry Brigade, at Tidworth, has been carrying out training this year as a mechanized formation, and the 1st Cavalry Brigade, at Aldershot, is now being reorganized on a mechanized basis. All the cavalry regiments in both brigades are to become light tank regiments.

Experience in handling the Mobile Division is needed before its final composition and organization can be decided; but for training purposes it will comprise the 1st and 2nd Cavalry Brigades, the Tank Brigade, and a proportion of units (all mechanized) of the other arms—artillery, engineers, signals and infantry—and administrative services.

KING EDWARD VII CONVALESCENT HOME FOR OFFICERS, OSBORNE, ISLE OF WIGHT.—Osborne House, formerly the private residence of Her Majesty, the late Queen Victoria, was presented to the Nation by King Edward VII in 1902, and was, at the wish of His Majesty, adapted in 1904 for use as a Convalescent Home for Officers of the Navy, Army, Air Force, and Indian Army. All Officers of the Territorial Army, the Regular Army Reserve of Officers, the Militia and Supplementary Reserve who require a period of convalescence after illness contracted whilst on Service or in the normal course of civil life are eligible for admission.

"TOMMY ATKINS."—The name "Tommy Atkins" is a proud connecting link binding the British soldier to those other days when the majority of present-day regimental traditions were in the making.

In the autumn of 1794, during the campaign in the Low Countries, a British infantry regiment was fighting a rear-guard action near the village of Boxtel. One of the younger lads of the regiment, which was composed chiefly of recruits, was in danger of being cut off by the enemy. An old soldier, who was withdrawing with the remainder of his company, noticed the lad's peril and rushed to his aid. The veteran bayoneted several of the enemy and cleared his young comrade's line of retreat, but he himself was overwhelmed and killed.

A sequel to this incident took place in a room in Walmer Castle some thirty to forty years later. A Staff Officer in compiling a specimen for a new system of pay sheets wrote the name of an imagined soldier, whose account was to be circulated as a guide. The Duke of Wellington crossed out the name and wrote in its place "Thomas Atkins." He explained that Thomas Atkins was an old soldier of the 33rd Foot¹ killed at Boxtel where he (the Duke) first experienced being under fire. His Grace recounted the story of Thomas Atkins' death and said that when he thought of any particular private soldier his mind invariably reverted to Thomas Atkins and the action at Boxtel. The specimen pay sheet was circulated, and its continual use for some years afterwards led to the general adoption of the name "Tommy Atkins" for all soldiers.

TERRITORIAL ARMY

ARMY COUNCIL.—His Majesty has been graciously pleased to approve that General Sir Walter Kirke, K.C.B., C.M.G., D.S.O., Director-General of the Territorial Army, be nominated a member of the Army Council.

In his speech announcing this appointment, Mr. Hore Belisha, Secretary of State for War, declared that the time had come when the Territorial Army must in the

¹ The Duke of Wellington's Regiment (West Riding).

metaphorical and in the real sense be "given its head." By this act, the nation would express the value which it places on the indispensable services of the Territorial Army. In future, all questions affecting that Army would be concentrated and administered under the Director-General, who would be given an adequate staff for the purpose. A Territorial officer with the rank of Major-General is to be appointed Deputy-Director-General of the Territorial Army, and a second Territorial officer will be appointed as Assistant Adjutant-General, The War Office.¹

The objects of making the appointment of Deputy Director-General for one year only were to make it more easy for the officer selected to keep in touch with his private interests and to ensure a flow of Territorial officers through the valuable experience which the post would provide.

TRAINING.—The fine type of soldier in the London and Eastern formations, together with the accurate shooting by the artillery, has been the subject of special comment this year.

The recent order enabling officers on leave from India—some of them direct from the Waziristan operations—to attend Territorial camps has proved of mutual benefit to officers concerned and to the Territorial Army; and the high standard of efficiency reached by the Territorial Army in the short time at its disposal has made a deep impression.

Instructors and demonstration units from the Regular Army have been provided on a generous scale this year, and have played a notable part in raising the general level of training.

ANTI-AIRCRAFT.—An anti-aircraft display given by detachments from the 1st Anti-Aircraft Division on 7th October, 1937, at Wembley Stadium was attended by Mr. Hore-Belisha, Secretary of State for War, and by General Sir Walter Kirke, Director-General of the Territorial Army. Three anti-aircraft guns, attended by searchlights and sound detectors came into action in the middle of the area. During the running commentary, an officer made an appeal for 9,000 recruits and explained that 2,000 guns were required to surround London "with a ring of fire."

The first "Queen Bee" pilotless and wireless controlled aircraft to be shot down this year was hit by the 171st Battery, 61st A.A. Brigade R.A. (T.A.), during practice camp at Watchet, Somerset. The machine was flying at a height of about 4,000 feet and a range of about one mile, when it was engaged by a section of guns and hit by the second salvo just behind the engine. It lost altitude, went into a spin, and crashed into the Bristol Channel. "It was pretty good shooting," said a Battery officer, "for there were low clouds and visibility could have been much better; an excellent finish to a fortnight's camp."

THE KING'S CUP.—The King's Cup for Horse, Field and Medium Artillery was won by the 235th Battery, 59th (West Lincs.) Medium Brigade, R.A., commanded by Major D. I. Crawford. This is the second time within three years that this Liverpool Brigade, commanded by Lieutenant-Colonel H. C. Servaes, has secured this honour. The level of efficiency reached by this Brigade may be gauged from the fact that this year, as a sportsmanlike gesture, the Brigade Commander decided not to enter the Battery that had won previously. Honours were distributed widely throughout the country as the 357th Battery, 90th (City of London) Field Brigade was second and the 319th Battery, 80th (Lowland—City of Glasgow) Field Brigade was third.

¹ Major-General Sir John Brown, K.C.B., C.B.E., D.S.O., T.D., and Colonel J. K. DUNLOP, O.B.E., M.C., T.D., have been appointed Deputy Director-General and Assistant Adjutant-General respectively.

The conditions of the competition involved engaging various targets—medium guns with H.E., and field guns with time or percussion shrapnel. Marks were allotted for gun drill, selection of O.P.'s, issue of orders by Battery Commanders and the time taken in ranging. Major-General A. P. Y. Langhorne, Inspector of the Royal Artillery, declared that he was astonished at the keenness and general efficiency, witnessed throughout the competition.

THE KING'S PRIZE FOR COAST DEFENCE.—The King's Prize for the Counter-Bombardment Competition with 9.2-in. guns was won by the 185th Battery, Pembrokeshire Heavy Brigade, R.A., commanded by Major the Lord Merthyr. The 180th Battery, Dorsetshire Heavy Brigade, commanded by Major E. S. Turner, was second.

Under ideal conditions of weather, the guns engaged a three hundred foot target towed by a fast launch at a range of about five miles and straddled the screen with the first salvo.

RECRUITING.—"Recruiting is steadily rising, and we are to-day getting a better class of man into the Territorial Army than ever before—in fact, we are getting the best. I could mention units in which it is almost as difficult to get a commission as a Second-Lieutenant as it is to become an Alderman of the City of London."

These words are taken from a speech made by the Director-General of the Territorial Army, responding to the toast of the guests at the Livery Dinner of the Worshipful Company of Wheelwrights at the Mansion House, presided over by the Master, Mr. T. Harvey Hull.

During the month of September, 1,906 recruits were approved for the Territorial Army. September, the month after the majority of camps, is usually one of little Territorial activity, and as a result, the Monthly Return has in the past shown a fall in numbers. Last month, however, for the first time for twelve years, the total numbers of the Territorial Army have actually risen, the increase being 21 officers and 185 other ranks.

During the six months April to September, 1937, the intake of recruits was 21,390, compared with 21,638 for the corresponding period last year.

The total strength of officers and other ranks on 1st October was 8,878 officers and 146,378 other ranks, compared with 7,730 officers and 132,296 other ranks at 1st October last year.

The 1st Anti-Aircraft Division has during the month of September increased from 10,930 to 11,193, and is now 52.1 per cent. of its peace establishment. The 2nd Anti-Aircraft Division during the month increased from 10,756 to 13,207, and it is now 53.6 per cent. of its peace establishment.

The leading Divisions (all ranks) on 1st October were as follows:—

		Peace Establishment.	Strength	Percentage of Establishment.
51st (Highland) Division	.. ..	9,900	9,286	93.8
42nd (East Lancashire) Division	.. ..	9,851	8,842	89.8
50th (Northumbrian) Division	.. ..	8,869	7,852	88.5
55th (West Lancashire) Division	.. ..	9,494	8,406	88.5

TERRITORIALS FOR ULSTER.—Authority has been granted for the extension of the British Territorial Army to include Northern Ireland. Recruiting has already begun; arrangements for the completion of units have been perfected; H.Q. are established in Belfast; and an R.E. unit will be formed immediately.

CONVERSION OF UNIT.—The King has been pleased to approve that the 8th (Isle of Wight Rifles) ("Princess Beatrice's") Battalion, The Hampshire Regiment (T.A.), on conversion from Infantry to Royal Artillery, be designated The Princess Beatrice's (Isle of Wight Rifles) Heavy Brigade, Royal Artillery (T.A.).

This unit will consist of: Brigade Headquarters; 189th Heavy Battery, Royal Artillery (T.A.); 190th Heavy Battery, Royal Artillery (T.A.).

CHANGE OF TITLE.—His Majesty the King has been pleased to approve the designation of the 10th (Liverpool Scottish) Battalion, The King's Regiment (Liverpool), being changed to The Liverpool Scottish, The Queen's Own Cameron Highlanders.

INDIA

DEFENCE DEBATE.—Replying to a resolution in the Legislative Assembly urging economy in military expenditure. Mr. C. M. Ogilvie, Secretary to the Defence Department, declared on 3rd September, 1937, that, in no circumstances could the number of British troops in India be reduced. The world, he affirmed, was in a highly disturbed condition, and in the event of a major war, the British-Indian Army would have to shield the frontiers of India until the arrival of the British Army from home for their assistance. Some time must necessarily elapse before these reinforcements could land and until then "there should be sufficient troops here to withstand successfully an onslaught."

The cost of the British troops, he emphasised, seemed to have been exaggerated, and amounted only to £9,000,000 annually. The admixture of British and Indian troops gave the tax-payer the best value for his money. "Instead of expecting further reductions in military expenditure, India may have to face an increase."

INDIAN TROOPS FOR CHINA.—Two Indian infantry battalions, the 5th Battalion 6th Rajputana Rifles and the 4th Battalion 19th Hyderabad Regiment, have sailed for Hong Kong and Singapore, where they will be employed on internal security duties. Service in China is, however, no novelty for the Indian Army as the battle honours "Taku Forts," "Pekin, 1860," "Pekin, 1900," "China, 1900," inscribed on the Colours of many Indian units bear witness.

LIGHT AUTOMATIC RIFLES.—Criticism has been directed at the authorities in India for having adopted the Vickers-Berthier "gun" in place of the "Bren," with which the British Army at home is about to be re-equipped. These critics overlook certain important considerations. The Army in India is practically on a war footing, is liable to be called upon for active duties at the shortest possible warning, and has, in fact, just concluded a "minor" campaign, in which some 40,000 men have had to be employed. The Lewis gun, with which the British and Indian Armies were equipped during the Great War, had become an obsolete weapon, both cumbersome and liable to stoppages. It was imperative, therefore, that the Army in India should replace this weapon with a more up-to-date one, without delay.

The authorities at home, suffering more from financial stringency and perhaps less affected by the need for speed, could afford to spend a long time in experiments, and in searching for the ideal. Numerous patterns of light automatics, such as the Browning, Madsen, Z.B. (later to develop into the "Bren") and Vickers-Berthier, were tried out; but no conclusions were reached at that time. The final choice appeared, however, to lie between the Z.B. and the Vickers-Berthier (V.B.) types.

In trials held in India, the V.B. had shown a slight superiority over the Z.B., and the then Commander-in-Chief decided to adopt it forthwith. Necessary orders

were placed and the V.B. has been in the hands of the Army in India for some years. It has proved itself to be a highly efficient weapon. The new V.B. Mark III, which incorporates several advantages copied from the "Bren," is being produced in quantity by Indian mechanics from the Government factory at Ishapore, near Calcutta.

MILITARY SCHOLARSHIPS.—The Punjab Government has offered five scholarships a year, of £45 per annum, for a maximum of six and a half years at the Royal Indian Military College and a further two and a half years at the Indian Military Academy at Dehra Dun. This decision is the result of a speech on the subject of Indianization of the Army made about two years ago by Sir Philip Chetwode, then C.-in-C. in India, in which he declared that the right type of young Indian was not coming forward in sufficient numbers to take the King's Commission.

SPECIAL LANGUAGE LIST.—To encourage Indian Army officers to take up the study of selected languages, a number of additional concessions have been approved. The names of officers who have qualified or requalified as first-class interpreters in one or more selected languages during the past five years will be placed on a Special Language List, and such officers will be eligible for certain appointments; these will be Military Attachés at Teheran, Kabul, and Peiping, Intelligence Bureau posts, G.S.O.3 in the Frontier Districts, Northern and Western Commands, and 1st, 2nd, and 3rd Divisions, Military Operations Directorate (M.O.3), official interpreter posts, translation officers, and secretary to the Board of Examiners.

The late Field Marshal Sir William Robertson, who was an expert in Eastern tongues and had no less than five languages to his credit, declared that it was for that reason that he had been selected as a subaltern for a Staff appointment at Simla, where he was given his first opportunity to distinguish himself.

PENSIONS.—According to the Ministry of Labour Gazette, the cost of living in the United Kingdom has risen by 10 per cent. as compared with last year. In reply to a query as to whether any proposals for a remission of the existing "cuts" in the pensions of retired I.A. officers were under consideration, the India Office have stated "that pensions of retired officers of the Indian Army were stabilized on favourable terms with effect from 1st July, 1935." It was further remarked that the present consolidated rates of pension were not subject to alteration on account of variations in the cost of living, and that no proposals for the revision of pensions were being considered at present.

AUSTRALIA

REARMAMENT.—"Hopes that the burden of armaments would be relieved by reduction on the part of heavily-armed powers and limitation of competition have proved disappointing. Without being alarmist, the Government wishes to put clearly before the people of the Commonwealth the provision that it is incumbent upon them to make for national defence." These words were uttered by Mr. R. G. Casey, Treasurer to the Australian Government, in presenting last year's budget to the House of Representatives.

This year's Defence Estimates total no less than £11,531,000—nearly £3,000,000 more than last year's—and constitute a record for Australia. Large sums are being expended on the Navy and Air Force. The Army strength is to be expanded to 23,000 and special attention is to be paid to coastal defences; mechanization will be speeded up and new oil-tanks are to be established near Sydney. Training in anti-gas and passive defence measures against air attacks will be undertaken in

large centres of population. Vigorous attempts are also being made to render the Commonwealth independent of outside sources of military supplies.

New munitions factories for the manufacture of guns, shells, high explosives and machine guns have been erected near Melbourne, where over 3,000 workpeople are employed and in which £3,500,000 of capital is invested. The manufacture of the new light automatic weapon, the "Bren," has been put in hand, and a £250,000 factory is to be planned for its production in mass. The Federal Government has purchased the manufacturing rights of the "Bren," patents for which are held in Czecho-Slovakia; and the necessary machinery and equipment will be purchased in the United Kingdom.

A Tank Corps school is to be established in Victoria and modern British tanks are expected shortly to form a nucleus.

EGYPT

DEFENCE MEASURES.—A permanent military base is to be established at Mersa Matruh, about 200 miles West of Alexandria. Major-General Marshall-Cornwall—British Military Adviser, and Choukri Pasha—Chief of Staff of the Egyptian Army, have completed a reconnaissance of the Western desert and have recommended the large-scale building of barracks. The construction of an aerodrome, heavily ringed with A.A. defences, is also to be undertaken. The field defences, organized by the British troops during the crisis of 1935, are to be maintained and manned by Egyptian Army Troops. Special attention is also being directed to the A.A. defence of the irrigation barrages in the Nile Valley.

The new conscription law, reducing the age at which liability for service begins to eighteen instead of nineteen years, has been approved. This measure, which makes military service obligatory for all Egyptians, Bedouins and Sudanese resident in Egypt, will raise the standing Army from 12,000 to 18,000 men. Hamdy Seif El-Nasr Pasha, Minister for War, has announced that military training is to be introduced in all Government schools and in the Egyptian University. Secondary school youths will be trained as N.C.O.'s by officers on the active list, while Officer's Training Corps—providing for one month's annual attachment to the Regular Army—will be instituted in the higher schools.

FOREIGN

FRANCE

ARMY MANŒUVRES.—On returning to Paris after attending the French Army manœuvres and visiting the frontier defences, Mr. Hore-Belisha, Secretary of State for War, made the following statement: "I am most grateful to have had the opportunity of inspecting the French defences. I am satisfied that they are as perfect as the ingenuity of man can make them. It is important that they should be so, for they are also the defences of French liberty. I am impressed by the patriotism, moral, and endurance of the French soldiers, who are the backbone of France."

The three-day Army manœuvres, the specific object of which was to study offensive and defensive operations in broken and wooded country, began on 13th September, 1937, in the provinces of Calvados and Orne. The 11th Corps (General Herscher) was engaged against the 4th Corps (General Boris) and a total of some 45,000 of all ranks, 6,000 horses, 4,000 motor vehicles and numerous air squadrons was employed.

Mr. Hore-Belisha and Field-Marshal Sir Cyril Deverell were the guests of Mons. Daladier, Secretary for Defence, and General Gamelin, Chief of the Army Staff, at Alençon, where the close liaison between the French and British Authorities was the subject of special note.

The troops were harassed by continuous rain, but General Gamelin declared that he welcomed the bad weather which would accentuate the severity of the test. The swollen streams afforded the Engineers ample practice in the rapid construction of light metal bridges capable of taking all kinds of mechanized units up to medium artillery. Most favourable reports have been received about the efficiency of the new long-range 6-in. guns, which can fire with accuracy up to eleven miles.

Since the War, the art of camouflage has been developed highly in the French Army and the troops were most cunningly concealed; petrol dumps were dug in well below ground; and all signposts on the roads in the region were taken down.

At the conclusion of the exercises, Mr. Hore Belisha proceeded to Strasburg, where he was received by General Requin, G.O.C. 20th Army Area, General Sancelme (representing the Military Governor of Strasburg) and Mr. W. S. Edmonds, the British Consul-General. After breakfast, Mr. Hore Belisha, attended by French staff officers, motored to various points in the Maginot line where he spent the entire day.

GERMANY

ARMY EXERCISES.—Field Marshal Sir Cyril Deverell, C.I.G.S., Air-Marshal Sir Arthur Longmore, Commandant, the Imperial Defence College and General Sir Edmund Ironside, G.O.C.-in-Chief, Eastern Command, flew to Germany to attend the manoeuvres, where they were the guests of Marshal von Blomberg, Commander-in-Chief of the German Forces and Director of the Exercises.

The six-day exercises, which started on 20th September, 1937, embraced all three Services—Army, Navy and Air Force, and were on an unusually extended scale. The manoeuvre area covered wide portions of the districts of Meckleburg and Pomerania and included the line of the Baltic Coast. The First ("Blue") Army (General von Rundstedt) comprising the 2nd and 3rd Corps from Stettin and Berlin was pitted against the 10th ("Red") Corps from Hamburg. Over 100,000 men are stated to have been engaged.

Herr Hitler, accompanied by Signor Mussolini, Count Ciano—Italian Foreign Secretary, Baron von Neurath—Germany Foreign Secretary, and Herr von Ribbentrop—German Ambassador in London, witnessed the climax of the exercises from the positions held by the 10th Corps. The British Military Mission, headed by Field Marshal Sir Cyril Deverell, was presented to Herr Hitler on the field, and met Marshal Badoglio—lately Italian Commander-in-Chief in Abyssinia, and General Roeder—the Hungarian Minister for War.

Tanks participated in large numbers, but the wooded and marshy nature of the terrain rendered their activities especially difficult. For the final assault on the "Red" defences, two brigades of some 600 tanks were launched in successive waves, well ahead of the supporting infantry. The anti-tank weapons, however, of the "Red" troops took such a heavy toll of the fighting vehicles, that it is doubtful if the attack could have succeeded.

MOUNTED INFANTRY.—The German General Staff are by no means of the opinion that the horse is valueless on the modern battlefield and have added to each infantry regiment, of three battalions, one troop of mounted infantry. This troop, which is

placed directly under the Regimental (Brigade) Commander consists of Troop H.Q., three sections (each of one N.C.O. and seven men), and "A" echelon of First Line Transport. The task of the troop is limited to close reconnaissance and protection; individuals are only to be employed as mounted orderlies in exceptional circumstances. Communication between mounted patrols and infantry is effected by a simple but ingenious system of coloured lights fired from a Verey pistol.

Advocates for the retention of horsed cavalry in the British Army should, however, not be over-hasty in drawing from this, conclusions favourable to their case. Germany, it should be remembered, has no Dominion or Indian cavalry to draw on in an emergency, nor are her defence problems on all fours with our own.

The German economic position, moreover, postulates that the horse should continue to play an important role in agriculture; and this may be an overriding reason for its retention in war.

HOLLAND

Marked increases in the strength of the Dutch Army have been notified. In Her Speech from the Throne at the opening of the Dutch Parliament, Queen Wilhelmina declared that the state of world tension and the danger of grave complications necessitated the immediate strengthening of Holland's defences, both at home and in the Dutch East Indies.

The existing rules relating to exemption from military service have been tightened up, and the annual quota of conscripts increased from 19,500 to 32,000. As Holland has a surplus of young men fit for military service, there will be no relaxation of the high physical and mental standards under which only some 60 per cent. of the annual contingent are accepted. To increase efficiency, the first period of annual training, at present from five and a half to eight months, will be extended to eleven months. This large increase in personnel will demand a drastic reorganization and expansion of the military machine.

A Light Division is to be formed. This will include cyclists, motor cyclists with machine guns, motorized anti-tank guns, motorized horse artillery, armoured car units and a regiment of light tanks. Divisional reconnaissance groups, attached to each division, will be composed of cyclist companies, armoured cars and one squadron of horsed Cavalry.

The cost of the various measures, which are now in hand, will be heavy, but the improved state of the Dutch finances will enable the country to shoulder without difficulty the increased financial burden, which is expected to attain an annual total of over four million pounds.

AIR NOTES

ROYAL AIR FORCE

UNDER-SECRETARY OF STATE FOR AIR

Lieutenant-Colonel A. J. Muirhead, M.C., M.P., has succeeded Sir Philip Sassoon in the office of Under-Secretary of State for Air.

APPOINTMENTS.

The following appointments have taken effect as from the dates shown :—

AIR MARSHALS.—P. B. Joubert de la Ferté, C.B., C.M.G., D.S.O., to Headquarters, R.A.F., India, as Air Officer Commanding, to date 29th September, 1937.

AIR COMMODORES.—W. B. Callaway, A.F.C., to No. 5 (Bomber) Group, Mildenhall, to date 17th August; T. E. B. Howe, C.B.E., A.F.C., as Senior Air Staff Officer and temporary Air Officer Commanding, No. 12 (Fighter) Group, to date 8th September.

GROUP CAPTAINS.—K. C. Buss, O.B.E., to Air Ministry, as Deputy Director of Intelligence, to date 26th July, 1937; P. Huskinson, M.C., to R.A.F. Station, Leconfield in command, to date 2nd August; A. Grant, M.B.E., to Directorate of Medical Services, Air Ministry, for Staff duties, to date 1st September; E. D. Johnson, A.F.C. to R.A.F. Station, Mount Batten in command, to date 19th October.

UNIVERSITY CANDIDATES.—Thirteen University candidates have been selected for appointment to permanent commissions in the General Duties Branch of the Royal Air Force; six from Oxford, five from Cambridge, one from London and one from St. Andrews.

RETIREMENTS.

The following retirements have taken effect from the dates shown :—

Air Chief Marshal Sir John M. Steel, G.C.B., K.B.E., C.M.G., is placed on the retired list at his own request with effect from 12th September, 1937.

Air Commodore Henry Le M. Brock, C.B., D.S.O., is placed on the retired list at his own request with effect from 1st August, 1937.

ROYAL AIR FORCE EXPANSION.

The following is a summary of the progress of the expansion of the Royal Air Force since this became the Government's policy in May, 1935 :—

New Stations.—The number of new stations and armament training camps that have already been opened total twenty-five, and a further twenty-one sites have been selected.

Recruiting.—Since 1st April, 1935, some 3850 pilots have been selected, and approximately 3500 have already completed or are in course of training. The

number of airmen who have entered from the same date total some 25,200, this figure being made up as follows :—

Skilled fitter class	1,164
Mate, flight mechanics and flight riggers	8,050
Wireless operators, armourers and photographers	3,526
Other trades	12,460
	<hr/>
	25,200

In addition, approximately 4840 boys are undergoing training at Halton and Cranwell as aircraft apprentices, and elsewhere 960 as boy entrants.

The total strength of the force is now approximately 60,500.

R.A.F. VOLUNTEER RESERVE (MEDICAL BRANCH).—A new branch of the R.A.F. Volunteer Reserve for medical officers is being established for the reinforcement of the R.A.F. medical service in times of national emergency. Candidates must be qualified to practice medicine and surgery, be registered under the Medical Acts in force in the United Kingdom, and be below the age of forty.

The initial period of service will be five years. Entrants will normally be given the rank of Flying Officer and will be eligible for promotion to Flight Lieutenant after two years approved service. Those with exceptional qualifications may be appointed in a rank higher than Flying Officer. Officers will be required in their first year of service to attend an Air Force unit for eighteen working days training in the duties of a medical officer. In subsequent years they will be liable, if called upon, to attend for twelve working days annually. They will receive a retaining fee of £15 a year, and the pay and allowances of their rank during periods of training. They will also receive on entry an outfit allowance of £25.

PERSONNEL

INSPECTOR-GENERAL OF THE ROYAL AIR FORCE.—The office of Inspector-General of the Royal Air Force, which was originally held for two years by Air Chief Marshal Sir Robert Brooke-Popham, was reintroduced in August of this year with a view to assisting the Chief of the Air Staff in the work of supervising the work of the expansion of the Service. The Inspector-General is now Marshal of the Royal Air Force Sir Edward Ellington, who was Chief of the Air Staff until September of this year. His office is in Bush House, Aldwych, W.C.2.

ENGINEER OFFICERS.—Thirteen Flight Lieutenants have completed the specialist engineering course at the R.A.F. School of Aeronautical Engineering, Henlow, and are granted the symbol "E" against their names in the Air Force List. Two of them have been selected to attend an advanced course at the Imperial College of Science and Technology, and one to attend an advanced course at Cambridge University. Two more have been appointed to a torpedo course in H.M.S. "Vernon."

TRAINING FOR RETIRED OFFICERS.—According to a recent amendment to King's Regulations and Air Council Instructions, retired officers of the R.A.F. who are liable to recall at a time of imminent national danger or great emergency may in future be designated in peace time for the appointments that they will be required to fill. Arrangements may be made for an officer so selected to undergo training in his duties, not exceeding fourteen days in any one year, as may be considered necessary.

During this training officers will be paid at the rates laid down for re-employment in emergency, i.e., the difference between the full pay of their rank and the half or

retired pay of which they are in receipt. No allowance will be made for the upkeep of the uniform.

TRAINING OF NEW ENTRIES IN SKILLED TRADES.—Early next year, 1300 well-educated boys will be entered for trade training; of these 900 will be entered as aircraft apprentices, and the remaining 400 as boy entrants. Both types of entrant will have good opportunities for interesting careers, including selection for flying training, and the possibility of promotion to Commissioned Rank. The age limits for Aircraft Apprentices are 15 to 17, and for Boy Entrants 15½ to 17½.

Aircraft Apprentices are trained for a period of three years in the highly skilled trades of fitter, fitter (armourer), wireless operator mechanic, and instrument maker. Their initial period of service is twelve years from the date of attaining the age of eighteen years.

Boy Entrants are trained in the trades of armourer, photographer and wireless operator. A sound training is given. Their initial period of service is nine years from the date of attaining the age of eighteen years. The majority of air Observers will be drawn from among this type of entrant.

VOCATIONAL TRAINING.—Arrangements have been made with the Ministry of Labour for airmen on their discharge or on transfer to the Reserve to be given assistance in getting civil employment. The training may be given to unskilled airmen and those whose Service trade has no equivalent in civil life. Courses will also be given to skilled tradesmen to adapt them to civil industry. Numbers will be limited to the capacity of industry to absorb them.

ATTACHMENT OF FOREIGN OFFICERS.—Lieutenants Cemal and Saim, of the Turkish Air Force, were attached to the School of Air Navigation, Manston, from 17th August until 23rd October, 1937.

Engineer Captain J. Söderberg, of the Swedish Royal Air Force, was recently attached to the Home Aircraft Depot, Henlow, and Lieutenant Chaluay Makarasara, of the Siamese Air Force, to No. 8 Flying Training School, Montrose.

Major G. Schyberg, of the Swedish Royal Air Force, was attached to the R.A.F. College, Cranwell, from the 20th September to the 2nd October, and Captain H. T. Anilinne, of the Estonian Air Force, has been attached to the Army Co-operation Course at Old Sarum from the 20th September to the 10th December.

ORGANIZATION.

COASTAL COMMAND—NEW TITLES.—Flying-boat squadrons will in future be known as General Reconnaissance squadrons. This does not imply any change to those squadrons which are already designated by that title. Except for Torpedo Bomber squadrons, all squadrons in the Coastal Command will in future be known as General Reconnaissance squadrons.

NEW ARMAMENT TRAINING CAMP.—On the 1st December, No. 7 Armament Training Camp will open at Acklington, Northumberland, and will become part of the Training Command for the Armament Group. Range facilities for this camp will be available at Druridge Bay as from the 1st January, 1938.

BALLOON BARRAGE GROUP.—The Headquarters of No. 30 (Balloon Barrage) Group has been moved to Kelvin House, Cleveland Street, London, W.1. The Group is commanded by Air Commodore J. G. Hearson, C.B., O.B.E., D.S.O., R.A.F. (retired).

NOMENCLATURE OF NEW TYPES.—The Fairy light reconnaissance seaplane with

a Rapier VI motor will be known as the Seafox I. The Blackburn dive-bomber fighter, with a "Perseus" motor, will be known as the "Skua I."

GENERAL

VISIT OF GERMAN AIR FORCE OFFICERS.—A number of Officers of the German Air Force, headed by General Milch, State Secretary for Air, arrived by air at Croydon aerodrome on Sunday, 17th October, and were the guests of the Air Council for a week. This invitation was extended to them as being a reciprocal visit to that paid to the German Air Force by Royal Air Force Officers, under the leadership of Air Vice-Marshal C. L. Courtney, C.B., C.B.E., D.S.O., then Deputy Chief of the Air Staff, in January last.

On 18th October the German officers were received at Buckingham Palace by H.M. the King.

The programme of the visit also included a visit to Mildenhall, where the party inspected a number of new types of R.A.F. aircraft and ground equipment; after which there was a fly-past. They also saw the Cadet College at Cranwell, the Training Station at Halton, and a Shadow Factory.

ARMY CO-OPERATION

CO-OPERATIVE TRAINING.—Co-operative training culminated this quarter, during which A.C. squadrons worked with all Army Commands during Brigade, Divisional, Inter-Divisional and other exercises. One flight from 26 (A.C.) Squadron was detached to Leuchars for three weeks and worked with various units of the Territorial Army in camp in Scotland.

On one occasion No. 16 (A.C.) Squadron produced thirty-eight sorties in one day while co-operating with the 3rd Division.

Nos. 18 and 57 (B.) Squadrons, and Nos. 29 and 64 (F.) Squadrons took part in Army Exercises; both Army and Air Force benefited from this training. The pilots received practice in observing ground military movements. Low-flying attacks were carried out on numerous Regular and T.A. units who are daily becoming more air conscious.

ARTILLERY PRACTICE CAMPS.—Co-operation at Artillery Practice Camps at Redesdale, Okehampton, Larkhill, and West Down was provided by Nos. 2, 4, 13, 16, and 26 Squadrons.

One shoot was conducted with a naval battery, using Army procedure, by an Air Force pilot. All three Services reported that the procedure was successful.

PHOTOGRAPHY.—In addition to normal photographic activity, photographs were used to study the effects of various forms of camouflage. Useful information regarding the result of various forms of shading as camouflage for tents, etc., was obtained.

BOMBER TRANSPORT AIRCRAFT.—A Vickers Valentia Bomber Transport aircraft was allotted to 50 (A.C.) Wing from May to the end of July, and many troop-carrying practices were exercised by all commands. One of those in the Southern Command, in conjunction with a Bristol Bombay and a Handley Page, was to test out the supply of mechanized forces by air. During this exercise a quantity of rations, spare parts, petrol and oil was transported from Andover to Boscombe Down.

Approximately 169 flights were made and 2960 troops were carried.

CO-OPERATION WITH TANKS.—The problem of communication with aircraft is rendered more difficult by the fact that armoured formations cannot be accompanied by Royal Air Force wireless tenders, which are non-fighting vehicles requiring protection. The Tank Brigade have given much attention to the subject, and No. 16 Squadron now regard it as normal to work to a tank instead of to a tender.

NIGHT RECONNAISSANCE.—No. 53 (A.C.) Squadron, which with No. 59 (A.C.) Squadron, is paying special attention to training in night reconnaissance, gained some valuable experience in the work during the Aldershot Command Administrative Exercise. The differences between day and night reconnaissance were well brought out, particularly as regards the necessity for exploiting the smallest clue to the maximum extent.

The differentiation between civil and military movement is an ever present difficulty during exercises in peace, but the correct use of flares was practised and ground forces were exercised in the special precautions necessary for the avoidance of observation by aircraft by night.

OVERSEAS COMMANDS

FLIGHTS.

TRAINING CRUISE TO THE MEDITERRANEAN.—Four flying boats of No. 204 (G.R.) Squadron carried out a training cruise to Malta and back during the month. The itinerary was:—

<i>Date.</i>	<i>From</i>	<i>To</i>
9th August ..	Mount Batten ..	Gibraltar.
11th " ..	Gibraltar ..	Malta.
27th " ..	Malta ..	Gibraltar (3 aircraft).
28th " ..	Malta ..	Gibraltar (1 aircraft).
29th " ..	Gibraltar ..	Lisbon.
30th " ..	Lisbon ..	Mount Batten.

Between the 11th and the 24th the aircraft carried out training at Malta and co-operated with the Mediterranean Fleet prior to its departure on the autumn cruise.

DELIVERY FLIGHT TO SINGAPORE.—A Singapore III flying boat was flown out to Singapore to complete the establishment of flying boats in the Far East Command, leaving Calshot on 17th August. The boat was leaving Karachi on 25th of that month when it made a forced landing on the Indus at Hyderabad, and was slightly damaged. The necessary repairs were effected by the 28th, and the aircraft arrived at Singapore on 31st August.

TRANSFER OF TWO FLYING BOAT SQUADRONS TO THE MEDITERRANEAN.—Five Singapore III flying boats of No. 209 (G.R.) Squadron and five of No. 210 (G.R.) Squadron flew to the Mediterranean to take part in the Anti-Piracy Patrol Scheme decided upon by the Nyon Agreement.

No. 209 Squadron left Felixstowe on 17th September, and arrived at Malta on the 19th. No. 210 Squadron left Pembroke on 20th September, and arrived at Malta on 24th.

ADEN

FALSE REPORTS IN THE PRESS.—On 30th September the Air Ministry announced: "With reference to the report that has appeared in the Press to the effect that a British officer and four R.A.F. men have been killed in action against tribesmen in

Aden, the Air Ministry has received a categorical denial of the report from the Air Officer Commanding, Royal Air Force, Aden. No officers or airmen have been killed, and the situation in Aden and the surrounding territory is normal. The further report that reinforcements are being sent to Aden is also unfounded."

INDIA.

WAZIRISTAN SITUATION.—The situation in Waziristan showed a steady improvement during the period under review. In the North the Tori Khel tribe submitted to the Government and provided tribal police in their territory. In the South the main sections of the Mahsuds, who had been guilty of taking part in hostilities, quietly accepted the Government's terms and disavowed hostile intentions. Although the Faqir of Ipi continued to be the focus of unrest, the tribal situation generally was very much easier despite sporadic raids by gangs of irreconcilable tribesmen.

Early in July, punitive air action was undertaken against the village of Razin. The inhabitants of this village, who are Jal Khel Mahsuds, had been taking an active part in hostilities and the Malik had refused to present themselves at Razmak when summoned. After the usual warning notices, bombing took place on the 8th, 9th, and 10th July. Altogether 130 hours' flying was involved and 11 tons of bombs dropped. By the end of the third day's bombing it was agreed that adequate punishment had been inflicted and the cessation of bombing was ordered. The leading Malik of the village arrived at Razmak with the intention of complying with the Government's orders. During the early part of August, three raids into settled districts in which 10 Hindus were kidnapped and many shops looted, were carried out by Bhitanni raiding gangs. Although mobile columns assisted by reconnaissance aircraft, promptly turned out, they were unsuccessful in intercepting the gangs. Proclamations were issued by land and air on the 20th August to the effect that, unless the kidnapped Hindus were returned by the 27th August, all Bhitanni territory, with the exception of the area within five miles of the administrative border, would be proscribed for air action until further notice. As the Bhitannis had failed to comply with the Government's orders by the 28th August, warning notices were dropped by air informing the inhabitants that air action would commence at dawn on the 30th August and warning them to evacuate the area immediately.

The Faqir of Ipi, who had taken refuge near the Mahsud-Bhitanni border, was driven therefrom by air action in July and retreated early in August to the mountainous country of Shawal. Here a gathering of some 4000 tribesmen took place on the 16th August, to discuss peace terms and the future tribal policy. All the chief Maliks and Mullahs, including the Faqir of Ipi and the Faqir of Shewa, were present. As a show of force before the peace terms were announced to the Jal Khel Mahsuds, an air demonstration of thirty aircraft in formations of ten in line astern was made over Shawal. This demonstration caused a certain amount of alarm amongst the followers of the Faqir of Ipi. On the 25th August proclamations were dropped by air over Shawal informing the inhabitants that until the Faqir of Ipi made his submission to the Government any tribe which harboured him would be liable to punishment.

During the whole of this period aircraft were engaged in providing patrols over prescribed areas and in carrying out extensive and varied co-operation duties with both regular and irregular forces, including the frontier constabulary. The escorting of road convoys and trains and the provision of close support for road protection

troops were important items of co-operation. Tactical reconnaissances and close support for defence ground columns involved extensive flying. A novel feature of air co-operation in South Waziristan was the provision by aircraft of No. 28 (Army Co-operation) Squadron operating from Manzai, of close support escorts for trains running between Manzai and Shabbaz Khel through the Pezu Pass.

FOREIGN

CHINA

China has recently been making efforts to improve and develop her Air Force. The Generalissimo, Chiang K'ai-shek, is anxious to strengthen and improve its efficiency, and public subscriptions have been raised for the purchase of aircraft. China buys all her aircraft from abroad, mostly from the United States, and has recently taken delivery of some Curtiss Hawk Fighters and Vultee attack-bombers. The published performances of these types are:—

Curtiss Hawk III.

Maximum speed	240 m.p.h. at 11,500 ft.
Armament	2 fixed guns and 474 lbs. of bombs.

Vultee Attack-Bomber.

Maximum speed	226 m.p.h. at 5800 ft.
Armament	4 fixed guns and 1100 lbs. of bombs.
Range	1500 miles.

FRANCE

FRANCO-GERMAN CIVIL AIR AGREEMENT.—The recently concluded commercial air agreement between Air France and the Deutsche Lufthansa allows for the co-ordinated operation of the French and German air lines across the South Atlantic, the exchange of technical information with regard to the establishment of a North Atlantic line and co-ordination between the two companies over routes to the East. This agreement has been severely criticized in the French Press. According to one journal, Germany gets a foothold in Morocco, Mauretania and Dakar at a very opportune moment for her, since the permission to maintain a base at Bathurst expires this year and is unlikely to be extended, as British Airways will be operating from there. The article stresses the fact that the German company will have the use of the very complete French meteorological and wireless services, and that in South America she will benefit by the ground organization, aerodromes and wireless services, which have all been created there by French capital; moreover, in the North Atlantic, not only will she use the bases in France with their radio and meteorological services, but, in addition, will benefit by a technical collaboration which will go so far as to communicate details of the new prototypes on which all the French hopes are based. In exchange France does not even receive permission to land at the Azores, which she has vainly tried to obtain from Portugal and which the Germans possess, but Lufthansa is to place her catapulting boats at the disposition of the French, whose commercial aviation does not possess a single catapult aircraft.

In the East, where she has lost her right of entry into Russia, Germany has been looking for bases to enable her to complete her Eurasia service to China. The agreement provides her with those at Damascus and Indo-China, with the sole proviso that her Eurasia time-table is to be altered to connect with the Eastern Service of Air France.

It is also reported that the pilots of Air France have sent a letter of protest to M. Pierre Cot, the French Air Minister, pointing out the danger of German infiltration and the fact that Air France is technically in a position to fly the routes in question effectively without any outside assistance.

GERMANY

NEW AIRCRAFT TYPES.—Four new military types were seen in public for the first time at the Zürich meeting in July; these were the Dornier 17, the Messerschmitt 109, the Heinkel 112 and the Fieseler 156.

The Do. 17 is a twin-engined high-wing monoplane which has been supplied in some numbers to German bomber squadrons. The model shown at Zurich had Daimler-Benz engines of 960 h.p. No performance details have been disclosed, but it won the Circuit of the Alps Race at a speed of 235 m.p.h. over a distance of 220 miles, which included two intermediate landings. Time spent on the ground was presumably not counted in calculating the winner's speed.

The Me. 109 (which, from the fact that it is built by the B.F.W. concern is also sometimes referred to as the Bf.109) is a low-wing monoplane S.S. fighter, which closely resembles its predecessor the Me. 108 "Typhoon" touring aeroplane. Two versions were present at Zurich, one fitted with the Daimler-Benz "600" engine of 950 h.p., and the other with the Jumo 210, of 650 h.p. The International Speed Race over four laps of a 30-mile course was won by the lower-powered model at a speed of 255 m.p.h.; the same model won the Circuit of the Alps in the single-seater class at just over 240 m.p.h. The Climb-and-Dive Competition was won by a Me. 109 with D.B.600 engine, which climbed to 8400 feet and returned to below 1000 feet in 2 min. 6 secs. The reliability of this type was not very well advertised by the fact that, of five examples present, two experienced forced landings in the course of the competitions, one being badly damaged through landing on an electric cable.

The He. 112 is another S.S. fighter, showing a family resemblance to the well-known He. 70. Only one example, fitted with a Jumo 210 engine, was demonstrated at the meeting, and as it did not take part in any of the competitions no estimate of its performance could be made.

The Fi. 156 is a light high-wing two-seater monoplane fitted with an air-cooled Argus engine of 240 h.p., and apparently intended for communication duties. It makes no pretensions to high speed, but by the extensive use of slots and flaps a speed range of 32-130 m.p.h. has been achieved. It can take off in 65 yards in still air, and has a landing run of only 30 yards.

DIVE-BOMBING DISCOUNTED.—A senior officer of the Danish Naval Air Service, discussing the tactics of dive-bombing, said that the Danes intended to abandon this form of attack, because the Germans had come to the conclusion that the highest velocity attainable by the bomber was insufficient to increase materially the penetrative power of the bomb, and that the method of attack would be unduly costly in casualties.

The Dive-Bomber units of the German Air Force are at present equipped either with single-seater fighters or with a special type whose function is rather that of "low attack" than of dive-bombing proper.

FOUR-ENGINE BOMBER.—Two photographs and a brief description of the Dornier 19 have now appeared in the Press. This is a straightforward mid-wing cantilever monoplane of all-metal construction, fitted with four "Bramo" (late

"Siemens") engines of 650 h.p. each, which are said to give it a top speed of 200 m.p.h. It is intended to fit it with better engines, when the top speed is expected to rise to 236 m.p.h. Other particulars given are: span, 115 ft.; length, 84 ft.; gross weight, 40,775 lbs. No details of range or load are given, but the type is described as a "long-distance" aeroplane. From its appearance there can be no question but that it is designed as a bomber.

ITALY

COMBINED EXERCISES.—For the combined exercises in August last, Sicily was chosen as the theatre of operations to emphasize its strategic importance: it is regarded as being in a position to command the approaches to the Tyrrhenian Sea, and also the passage from the Western to the Central and Eastern Mediterranean. Moreover, the conquest of Ethiopia and the resulting strategic and political situation in the Mediterranean and in Africa has caused the military centre of gravity of Italy to be moved towards the South, i.e., towards Sicily.

The part of the island in which operations took place is that lying West of a line Palermo-Agrigento. The characteristics of this area are a broken and difficult coastline, a certain number of important towns and villages, considerable stretches of barren and uninhabited country, formidable mountains and hills, and very limited road and railway communications.

The scheme consisted of a combined operation in which "Blue," having gained local command of the sea and of the air, disembarked a force of two divisions and one armoured brigade on the coast between Marsala and Cape Granitolo, and then endeavoured to advance northwards on Trapani and Palermo.

"Red," consisting of three divisions, constituted the defending force. Having been unable to prevent "Blue's" landing, "Red" endeavoured to hold up the enemy's subsequent advance and seize the first favourable opportunity to counter-attack.

The exercises were carried out under the direction of General Gabba—Marshal Badoglio's Chief of Staff during the Abyssinian campaign—and the "Red" and "Blue" forces were commanded respectively by Army Corps Generals Nicolosi and Ambrosio.

Besides practice in a combined operation, one of the objects of the manœuvres was to try out divisions of two regiments, as it is thought possible that the normal division of three regiments is too heavy. In this connection it is pointed out that the third regiment is generally used as a reserve by the divisional commander, while it may well prove more satisfactory to have instead a highly mobile reserve in the hands of the Corps Commander. Formations taking part in the manœuvres comprised the "Vespri" and "Peloritana" Divisions (XII Corps) and the "Sirte" and "Marmarica" Divisions of the new Libyan Corps. The "Vespri" and "Peloritana" Divisions each functioned as two-regiment formations, their third regiments being used to make up another improvised division. The composition of the armoured brigade ("brigata corazzata") is not given, but it apparently comprises light and medium tanks ("carri armati di rottura") and motorized infantry. It appears to be a development of the "brigata motomeccanizzata" seen on last year's manœuvres.

Air action was carried out mainly during the final stages of the exercises, and comprised attacks from the air on motorized columns. Some Air Force units were located in Sicily, while others operated from their normal stations on the mainland. The work of the latter was intended to afford data on the possibilities of action from

a distance against air and land bases, and to test the speed with which defence measures can be put into operation against this type of attack. In this connection various measures of passive defence were tested in the towns in the western part of the island. Special attention was devoted to communications on land and between ground and air.

It is reported that some of the most modern types of aircraft took part.

JAPAN

AIR DEFENCE LAW.—The Air Defence Law, which deals with duties to be undertaken by civilians, such as the control of lights, anti-gas and anti-fire precautions, and the provision of air raid shelters, was passed by the Imperial Diet on 27th March, 1937. The main features of the law are :—

- (i) Local Governors or Mayors of cities are to prepare Air Defence schemes in consultation with an Air Defence Committee.
- (ii) The said local authorities are granted the power to make temporary use of private lands, buildings, etc., in an emergency. They can call on individuals to assist when "air defence" is declared to be in force.
- (iii) The Government will pay 50 per cent. of certain expenses; but the local authorities appear to be responsible for most of the expenditure.
- (iv) Penalties for disobeying the local authorities are laid down.

NEW CLASS OF NAVAL AIR SERVICE CADETS.—A new class of cadet, who will be regarded as superior to the boy airman class, is to be recruited for the Naval Air Service. The class will be known as the "A" Class preliminary training cadet, and will start training at the age of 16. Cadets will undergo a four years training course and will eventually become Warrant Officers. They may be commissioned and promoted up to the rank of Commander. The first entry of 200 were due to start training on 1st September, 1937.

UNITED STATES

ARMY LIGHTER-THAN-AIR CRAFT.—General Westover, Chief of the Army Air Corps, announced last year that unless the limitations which had in the past been placed upon the application of air-corps appropriations to the repair of existing lighter-than-air aircraft were removed, the army would have to abandon the use of airships. The restriction was maintained, and in consequence the army has discontinued the use of airships. Moffett Field, home of the lighter-than-air craft of the Pacific coast, has become a regular base for Army Corps aeroplanes.

For artillery observation purposes, balloons will continue to be used until the autogiro or some other substitute has been found to be more satisfactory.

REVIEWS OF BOOKS

GENERAL

Haldane, 1856-1915. By Major-General Sir Frederick Maurice, K.C.M.G., C.B. (Faber & Faber). 18s.

Of recent years it has been the quaint usage of the Press and British public to term all changes in the organization, administration, and distribution of the King's naval forces as "a strengthening of the Navy," while every similar change in His Majesty's land forces is greeted with a doubting smile as "another Army reform." Robert Haldane, probably the greatest of Army reformers, was faced with no problems of abuse, such as sale of commissions, corrupt administration, flogging, and such like, but with the urgent need for the adaptation of the existing organization of the Army to the Empire's actual requirements. It was no cleansing of a sewer that he had to face, but the skilful readjustment of a machine which, though never high in popular favour, had done much good work in the past, to enable it to undertake a more formidable task than any it had yet been confronted with.

In all but national affairs the up-keep of highly technical machinery is entrusted only to highly trained technicians, but it is the peculiar practice of the English nation to entrust the upkeep of the fighting Services, upon whose efficiency national safety depends, to politicians totally unacquainted with their technique. The upbringing of the statesman, before the mantle of responsibility for any one of those Services is thrown upon his shoulders, may therefore become a matter of national importance. The first seven chapters of Sir F. Maurice's book are very rightly restricted to the upbringing of the statesman on whom fell the supreme responsibility of shaping the British Army for the Great War. They merit close study, but it must suffice here to note that Scotch blood and upbringing promoted straightness and clear thinking, and that the latter quality was further developed by subsequent training in Germany and practice at the Bar. It is, too, of much interest to read that as early as 1894 the late King Edward, then Prince of Wales, hailed Haldane as a future Lord Chancellor.

It was indeed a real piece of good fortune for the Empire that, on his first entry into high ministerial office, Haldane missed the Woolsack by a very narrow margin and had the Army assigned to his charge. From that point onwards Sir F. Maurice's volume merits the closest study by all interested in the control and organization of the fighting forces of the Crown. He makes it evident that, prior to Haldane's entry into the old Pall Mall precincts of the War Office, he had no very definite plan in his mind as to Army reorganization. In the previous February, realizing that Haldane would figure big in the next government, Sir George Clarke, then secretary of the Committee of Defence, suggested to him in a private letter that he, for George, should be empowered to do for the Army what Sir John Fisher had done for the Navy. Haldane replied the same evening, ignoring the personal offer, but

setting forth his own views as to the importance of ensuring complete efficiency by harmony between the Admiralty and War Office, the regeneration of the Militia with liability to serve abroad, the utilization of the Volunteers for home defence and as a second line for expansion of the Army, and the preparation of a comprehensive scheme of Imperial defence. But these ideas were coupled with a drastic reduction in the regular Army and in military expenditure generally.

But the somewhat crude ideas floating in Mr. Haldane's brain before he actually entered into office were rapidly modified on his assuming the reins of responsibility. This change was due to two causes: (1) "His readiness to learn, while his immediate predecessors had been prone to teach, made Haldane at once *persona grata* with his Generals." Haldane himself was able to inform an outsider in a letter "My Generals are like angels," and to refer to his Headquarters staff more than once as "the dear Generals." (2) A personal note dated 8th January, 1906, from Sir E. Grey (then Secretary of State for Foreign Affairs) warning him that Germany threatened to attack France in the coming spring, and that the British Government might be compelled to go to the latter's assistance.

Grey's note of warning is without doubt a most important historical document, for it formed the basis on which, guided by his "dear Generals," the Secretary of State for War built up the Army with which Great Britain faced the Great War some eight and a half years later. There were, of course, opposition and alternative proposals. Mr. Lloyd George, who in the later stages of the War so gravely imperilled our armies in France by retaining in England greatly needed reinforcements, urged that the strength of the proposed expeditionary force should be limited to 10,000 Regulars and a brigade of Guards! Lord Roberts, on the other hand, preached to a substantial following the doctrine of universal service, but failed to convince the majority of his fellow-countrymen. Sir F. Maurice's narrative sets out admirably the manner in which the scheme of preparation was gradually but steadily evolved by Haldane and the Headquarters staff. He quotes not a few extracts from memoranda written by Haig and Henry Wilson, but he might well have added that Sir William Nicholson's great brain was behind them, and that it was the C.I.G.S. office usage to inspire his chief subordinates verbally, and then make them work out on paper under their own signatures the details of his proposals, so that the subordinate reaped the credit of both idea and details. The baton and peerage with which Sir William Nicholson's work as Q.M.G. and C.I.G.S. under Haldane were rewarded is, however, sufficient evidence of the value that that great statesman attached to his guidance.

From a national point of view, one of the most interesting and instructive features of Sir F. Maurice's book is its absolute repudiation of the most unjustifiable rumour spread on the outbreak of the War by a group of politicians and a section of the Press that Lord Haldane was disqualified for reinstatement at the War Office by an undue attachment to Germany and the Kaiser. The facts, from letters and other documents set forth in the "Life," establish most definitely that that aspersion was a contemptible libel, the temporary acceptance of which by even a small minority of his fellow-countrymen must ever be a profound regret to the nation as a whole.

Sir F. Maurice's book is throughout most informative, fair-minded and accurate, except that his statement (on page 188) that prior to Haldane's advent to the War Office no General Staff had been appointed to Commands is not quite correct, for they are shown in the Army List of January, 1906, i.e., before Haldane actually took over the War Office.

The Immortal Heritage. By Fabian Ware. (Cambridge University Press). 2s. 6d.

"In the course of my pilgrimage, I have many times asked myself whether there can be more potent advocates of peace on earth, through the years to come, than this massed multitude of silent witnesses to the desolation of war." These words are taken from a speech delivered in the spring of 1922, in Terlincthun Cemetery, near Boulogne, by the late King George V.

This little book gives an account of the work and policy of the Imperial War Graves Commission during twenty years, and tells how and where a million dead soldiers of the British Commonwealth are commemorated. Thirty-two photographs of the beautiful memorials and cemeteries in the care of the Commission are included.

Pen and Sword in Greece and Rome. By Olive Lyman Spaulding, Colonel, United States Field Artillery. (Humphrey Milford, Oxford University Press). 9s.

Most students of the classics might consider that amongst the authors studied by Colonel Spaulding only Xenophon and Thucydides are truly worthy of consideration. But the author's aim is far wider: he sets out to glean from a series of writers—of very secondary literary importance it is true—the substance of classical military doctrine. Much that was written by Xenophon, for instance, proves that the art of war received considerable attention in his days. The well-known table of qualifications of the ideal general laid down by Socrates, and quoted by Xenophon, show that this subject was as familiar in classical Greece as it is in the most recent English writings. Siege engines were discussed by the ancient Greeks in the same way as tanks are a matter of controversy to-day.

In Latin classics there is no writer of the calibre of Xenophon, but the history of Polybius describes at length Roman tactics and, still more, the organic development of the legion. Vegetius, the later writer, continued this study and expanded it. It is curious to find that in post-classical times military writing flourished in Byzantium. In fact it may be said that Clausewitz was anticipated in the VIth Century A.D., in a Byzantine treatise on war, while a succeeding work, attributed to that fine leader, the Emperor Maurice, can be regarded as the inspiration of modern Military Law: in fact the parallel drawn between this work and the U.S.A. Regulations is amazingly close. After all, why not? The whole of medieval siegecraft was learnt by the Crusaders in the East. Their chief engineer, "William the Drunkard," was a renegade Genoese, who had acquired his skill from Byzantine sources.

Twenty Years as Military Attaché. By Colonel T. Bentley Mott. (Oxford University Press). 10s. 6d.

Colonel Mott was appointed military attaché at the U.S.A. embassy in Paris in June, 1900. He held this appointment, with a short interval, until well after the close of the War, and thus acquired a close acquaintance of the French army and of all its leaders before 1914. His remarks concerning the generals of the War are thus of considerable interest. The best part of his book, however, deals with General Pershing's work as Commander-in-Chief of the U.S.A. forces in France.

The gist of that story has already been told ; there is indeed an acknowledgment to several writers on that subject in Colonel Mott's preface, admitting that he is only repeating much that has been already written. But his familiarity with all French soldiers and politicians of the War, from Foch, Pétain and Clemenceau downwards, endow these chapters with a remarkable vividness that is enhanced by the freedom with which Colonel Mott is able to criticize.

The book opens with remarks on West Point, the American-Spanish War and the American Army of pre-War times—all highly readable but of secondary importance. As military attaché Colonel Mott travelled to England a good deal, also to most European capitals. His repertoire of sidelights on current events and of witty anecdotes is remarkable.

A remarkable feature of these reminiscences is Colonel Mott's impression that the Russo-Japanese War of 1904-5 marked the beginning of the Russian catastrophe of 1917. He distinctly blames Mr. Theodore Roosevelt's efforts to bring that war to a conclusion, in the interests of Japan so it proved, for the sake of world peace. From that blow Russia never recovered. Again he states that the Root Mission to Russia in 1917, of which he was a member, might have staved off the revolution, if the States had boldly adopted and financed Mr. Root's plan for a vast campaign of nationalist propaganda and relief in Russia at that moment.

Other remarks of Colonel Mott dealing with decorations, hats, Sam Browne belts, and social functions also afford excellent reading.

Le Déséquilibre Militaire. By General Niessel. (Editions "à l'Etoile").

The Frenchman's conception of his country as a beautiful woman, whose honour it is the duty of every chivalrous man to defend, leads him into muddled thinking when it comes to foreign relations. This booklet of 200 pages of well-written rearmament propaganda contains a fair summary of British disarmament after the War, and our present rearmament ; but behind the figures can be detected the assumption that this country's chief function in war is to supply man-power for the direct defence of France.

In 1914 the erroneous strategic ideas of Sir Henry Wilson led us into a continental policy of direct defence ; but Frenchmen would do well to ponder on the reasons which led so great a multitude of British volunteers to fight in Flanders ; and to realize that their prime motive was a determination, fixed for many centuries, that no strong enemy shall hold the coasts of the Low Countries.

Fortunately it can now be said that, at least on this side of the Channel, the lesson of those four wasteful years has been learned. If an assault on our basic interests compels us again to take sides in a European war, the probability is that we shall revert to our traditional and sounder policy : the policy of indirect defence by using sea-power to plant small expeditionary forces on the enemies' most tender and unexpected spots. British man-power remaining over from these services is likely to be employed in air-fighting, in carrying supplies by sea, and at home in making material for ourselves and our allies—but *not* in massed attacks against unbreakable defences in Flanders.

NAVAL

The Mutiny at Invergordon. By Lieutenant-Commander Kenneth Edwards, R.N. (Putnam). 10s. 6d.

It cannot be reiterated too often or made too clear, whenever the subject is mentioned, that there would never have been a "Mutiny at Invergordon" in 1931

if the Cabinet had not lost its head and the Board of Admiralty its courage, whereby the older and more valuable section of men in the Navy were threatened with a cut in their pay which would have imposed "a far greater degree of reduction and consequent hardship" upon them "than upon anybody else in the country." Not only did these men feel that they were being betrayed, "but many of them literally found themselves facing bankruptcy because of these cuts . . . they saw their household goods being seized and their homes broken up."

This unequal sacrifice was to take the form of a reduction of the scale of pay of all men entered before 4th October, 1925, to the appreciably lower standard which applied to men entered after that date. In the case of an Able Seaman this meant a reduction from 4s. to 3s. a day, or 25 per cent. All the more was this regarded as a "betrayal" because, soon after the introduction of the new rates, the Admiralty had specifically refuted a "misleading leaflet" which had been circulated in "an endeavour to stir up trouble," and which alleged that a step had been taken towards reducing the existing rates. "This statement is untrue and has no foundation in fact," was the Admiralty pronouncement.

The proposal to make this drastic "cut" in naval pay had originated with the Anderson Committee in 1925; but it had been staunchly resisted by Lord Beatty, then First Sea Lord, who insisted that it would constitute a breach of contract with the men. In the panic of the financial crisis of 1931, however, the Treasury and its minions within the Admiralty returned to the charge and succeeded in getting this "cut" adopted as part of the Government's economy policy—the result was "Invergordon," but subsequently the imposition of a flat and fair scale of "cuts."

We do not propose to follow Lieutenant-Commander Edwards through the maze of "contributory causes" which he enumerates. Interesting and ingenious as his efforts have been to collect examples of seditious influences and political pandering to insubordination, and to link them up with the title of his book, yet he leaves the impression that too much of it is "padding." His account of events at Invergordon during those few fateful days when the Atlantic Fleet came near to losing the traditional confidence of the nation in its Navy, is inaccurate in many details—times, days, ships, causes, and effects. Yet that is not to condemn his painstaking efforts wholesale.

If the recounting of this painful story does nothing else, it should serve as an everlasting warning to politicians not to ignore their professional advisers when they are contemplating any action which may effect the welfare and discipline of the Services. As to the part played by the Admiralty of that time, it left an impression on naval officers generally which only the passage of the intervening years and the confidence so widely reposed in the present Sea Lords has enabled that Department to live down. Nothing excuses mutiny; but equally nothing excuses abuse of power or lack of consideration which makes disciplined service intolerable.

It was a curious turn of events which caused good to come out of so much evil. The Mutiny was a powerful factor in forcing Great Britain to abandon the gold standard. This led slowly but surely to her financial recovery, to the restoration of pay cuts, and the rebuilding of the Navy to something of its former strength. For those who can "see the wood" in spite of the plethora of "trees," all these essential features are to be found in this book, and it is only fair to say that if as an historical record it leaves something to be desired, yet it seems to have been "the good of the Service" which, in the main, has inspired the author in taking on his difficult task.

Look to Your Moat. By Admiral Sir Barry Domville, K.B.E., C.B., C.M.G. (The National Book Association, Hutchinson & Co.). 10s. 6d.

Admiral Domville matches his native wit with a ready pen, and the result is a volume in which interesting facts and weighty adjustments are presented in a most readable form. He covers a wide range of sea affairs: the advantage of sea power to an empire such as ours; the nature of sea forces; the advent and influence of air power; the evil effects of recent diplomacy—the Washington and London Naval Treaties and the doctrine of Collective Security; a comparison of British and foreign naval forces and their strategic problems; bases and fuel; the Mercantile Marine; and the upbringing of the naval officer.

He has very clear and realistic ideas about the dangers to shipping in a future war: "The conception of the non-combatant in modern warfare is impossible—all ships bringing supplies to a belligerent are doing an unneutral action . . . and are laying themselves open to penalties and reprisals. . . . We should be prepared for our merchant ships to be ordered out of certain areas, or be ready to take the consequences, whether these are dropped from the skies or launched under water." Nevertheless he is far from taking a pessimistic view of or advocating a policy of scuttle and run from our position in the Mediterranean. While he deplores the rupture in our traditional friendship with Italy—brought about by the ridiculous and discredited "sanction" policy of the League of Nations, he points out that, in the event of a trial of strength in that sea, Italy has given hostages to fortune by her growing responsibilities and isolated garrisons in Africa, while "no country is more vulnerable to sea attack."

The author gives a timely appreciation of our situation in the Far East, and makes it quite clear that it would be madness for us to follow the dictates of those who would land us into a single-handed conflict with Japan, especially while we are so embroiled in European troubles.

His arguments for smaller battleships are not as logical as most of the rest of his book. Granted that a battle-fleet action between ourselves and the United States is not only unthinkable, but physically impossible, and that, therefore, we need not be influenced by the insistence of the latter to build 35,000-ton ships, we cannot agree with him that by setting a good example in smaller ships we would induce Japan to follow suit. He also ignores the fact that France, Italy, and Germany have all got 35,000-ton battleships under construction.

We think he is wrong in representing that the naval authorities have allowed the very great technical advantages of oil fuel, as compared with coal, to outweigh the danger of supplies of the former being cut off. The sources of oil fuel are widely spread throughout the world, and the dominant factor in controlling them is finance, not foreign policy. If we can safeguard the sea routes and deny them to our enemy, the oil merchants and the countries who depend so much on their oil resources for their revenue will gladly market their wares where delivery can be ensured. It was the submarine peril to tankers, not any alien control of oil, which put us on short commons during one period of the Great War.

Naval opinion to-day will probably agree with Admiral Domville in his criticism of too much staff work, and its ill-effects on initiative. But the over-zealous young staff officer, like the too enthusiastic specialist—whom he also condemns—should be suppressed by his commander, who ought to have the ripe experience to direct zeal and enthusiasm into profitable channels and restrain them from exceeding their true vocations. The author was himself a successful specialist, but it was in the days when gunnery was a branch sufficient almost unto itself. To-day the higher

command has learnt to realize that the ultimate object of all strategy and tactics, and the greater part of naval training and technique, is to be able to overwhelm the enemy's ships by gunfire whenever and wherever they can be met. This was far from being clearly understood by Flag Officers before the War, and too often the gunnery officer was bearing a burden on his own young shoulders which should have been shared by the whole system of command from Admiral to Midshipman. To-day naval officers as a whole are specialists in their weapons, instead of regarding them as being the charge and interest of the few.

But these are purely professional matters, and the author takes a far wider view of sea affairs than that which would only interest or be understood by a naval officer. *Look to Your Boat* is a book which can be warmly recommended to the other Services who would like to know more of Imperial Defence from the point of view of sea security, while one would like to think that the gist of it formed part of the education of every English man and woman.

The Art of the Admiral. By Commander Russell Grenfell, R.N. (Faber and Faber). 12s. 6d.

This very readable book is intended to supply a plain statement of naval strategy for the layman and professional officer. Its method is well suited to its purpose; it does not argue, but, treating principles as established truths, explains them and illustrates them by historical examples. One exception is a whole chapter of critical examination of the reasons for the war-time professional attitude to convoying, which seems out of proportion and keeping with the rest of the book.

The material factors of naval strategy are dealt with under appropriate headings of the main tasks of the fleet. In other chapters Commander Grenfell achieves exceptional success in presenting the moral factors in a tangible form; he emphasizes their supreme importance, and the spirit of the offensive is satisfactorily prominent. Where material and moral objects clash he insists on the supremacy of the latter; fighting and victory are an end in themselves. A final chapter on the components of the fleet is preceded by an undogmatic examination of the influence of the air, in which his conclusions incline to pessimism. A concluding consideration of the battleship's claim to existence leaves the matter open "though we should prepare our minds for the possibility of a change" is the author's somewhat indefinite opinion.

Clear, concise and temperate, this book can be recommended as an excellent text-book for the young naval student, and useful to older officers and others interested in the use of the Navy.

My Mis-spent Youth. A Naval Journal. By Henry Fitch. (MacMillan & Co.). 7s. 6d.

Paymaster-Lieutenant Fitch has a lively little story to tell of his early years in the Service from the time he entered in 1909 as an Assistant Clerk until 1920, when he was invalided out as the result of strenuous work under unhealthy conditions when acting as Secretary (and, in effect, Chief of Staff) to Vice-Admiral Troubridge on the Danube.

His experiences included a trip to India with the escorting squadron, which accompanied the King and Queen to the Durbar, service in H.M.S. "Defence," when she was shadowing the "Goeben" and "Breslau," at Belgrade with the

Naval Mission to Serbia, in the Grand Fleet at Salonika, and with the allied offensive on that front.

By his own showing, modest though it is, he had opportunities which many a young officer might envy, and he made the most of them. This is another of those personal chronicles of some of the side-shows of the War which are as good reading as any of the old-time naval fiction, and which are full of accounts of achievements to inspire initiative in a rising generation. The author can be assured that his youth was by no means mis-spent, and he will have the reader's full appreciation when, after fifteen operations and four years in hospital, he can still write "I have no regrets except for the Navy I loved so well."

Greek and Roman Naval Warfare. By William Ledyard Rodgers, Vice-Admiral U.S. Navy (retired). (U.S. Naval Institute, Annapolis). 27s.

This book contains a history of naval warfare from Salamis to Actium, with special reference to the method of fighting at sea, the design and characteristics of the ships, and the "logistics"—to employ that useful American term—of the oversea, or rather "longshore," campaigners of the period.

The outstanding feature of the book is the careful technical examination of the rowing vessels of the periods covered. "Going beyond the apparent meaning of the classical text," says Admiral Rodgers (page 29), "we have the right and duty to examine whether such meaning is compatible with engineering and nautical efficiency. . . . A bad design now must have been a bad design 2,500 years ago." For example, Admiral Rodgers gives the triere or trireme of the Peloponnesian war, when the tactical skill of the Athenian fleet was at its highest: a crew of 200, of whom 162 were rowers; a displacement of 69 tons, length of 105 feet, beam of 14.5 feet, draft of 3 feet, and a speed for a spurt of, say, 20 minutes, of 7 to 8 knots.

It is interesting to see that, as the ram, the primary weapon of the Athenian tactician, was superseded by missile weapons, the size of ships and complements increased greatly, but that, in spite of the ingenuity of shipbuilders in cramming in more rowers, the speed and handiness decreased.

The narrative part of the book suffers from over-compression. In the attempt to cover 450 years of history in a little over 500 pages, many of which are occupied by his painstaking examination of the technical factors, Admiral Rodgers has cut his description of events almost to the bone. Though he is clearly alive to the personal, political and economic factors, his references to them are brief.

To the ordinary reader, who has but little time to spare for reflection, the comments of one who has studied these campaigns as thoroughly as Admiral Rodgers would have been an invaluable guide to the lessons to be learned from them; but he has confined his own remarks to a few paragraphs at the end of the chapters. In consequence, the historical part of the book lacks the interest of Admiral Sir Reginald Custance's studies of the same period in *War at Sea*, or Mr. Holland Rose's *The Mediterranean in the Ancient World*, which are not among the authorities cited by Admiral Rodgers. In other words, Admiral Rodgers' book is more likely to be of use as a book of reference containing a large amount of technical information not readily obtainable elsewhere, than as a help to the student of naval warfare.

MILITARY

The History of the Royal Artillery from the Indian Mutiny to the Great War. Vol. II: 1899-1914. By Major-General Sir John Headlam, K.B.E., C.B., D.S.O. (The Royal Artillery Institution). 15s. (To officers of the Royal Artillery, 8s.).

This second volume shows that the Royal Artillery are fortunate in their regimental historian. The first volume was published in 1931 under the joint editorship of the late Sir Charles Callwell and Sir John Headlam. Only the final third came from the pen of the latter, and in the present volume, for which he alone is responsible, he demonstrates how admirably he can marshal the processes of development and revive half-forgotten controversies so that they become, not only interesting to those who remember them, but instructive to the new generation which has its own problems to face.

The present volume deals with the organization and equipment of the Royal Artillery during the present century, from the South African War to the eve of the Great War. It has therefore the advantage of dealing with matters within the memory of its editor, who also acknowledges his indebtedness to many of the officers who took a leading part in the changes recorded. It has a further advantage that these fifteen years of "rearmament," beginning with the shortcomings of South Africa and ending with our equipments ready for the great test of the continental campaign so long expected, give a cohesion to the subject-matter and make the volume complete in itself. It is a story of fascinating interest. Edgar Wallace could hardly have evolved anything more mysterious than the tale of the Ehrhardt guns which Sir Henry Brackenbury purchased to tide over a critical period. The field artillery of an army corps, eighteen batteries in all, complete with wagons and stores and five hundred rounds per gun, were packed at Dusseldorf with the utmost secrecy and shipped at Hamburg in sixteen specially chartered ships, and not half a dozen people knew anything about them till the crates were opened at Woolwich! These were our first quick-firing guns for the field army.

South Africa opened our eyes to the need of rearmament. Manchuria drove the lesson home and hinted at the possibility of trench warfare, and finally the *Entente Cordiale* introduced our experts to the French technique evolved with their famous and beautiful "75s." Sir John Headlam, in successive chapters, traces each of these three influences on our field, "siege" and coast artillery. Although the subject is necessarily a trifle technical, it is not difficult to follow in these pages, and it is to be hoped that officers of all arms will enjoy the study of this evolution, of particular value to-day, when we are again rearming.

A few chapters at the end are devoted to the "Regimental Institutions" during the whole period 1860-1914: the Ordnance College, the Repository, the "Institution" and the Band. One chapter deals with the Volunteers and Militia, and another with the Special Reserve and the Territorials. There are four well-chosen illustrations. One of particular interest at the present time is of a horse artillery battery on parade with nearly three hundred horses at Rawal Pindi in 1907. Of the admirably brief appendices, "F," the last, deserves attention: "Extracts from the Report on the Practice of the — Divisional Artillery" by an unnamed Brigadier-General. It epitomizes the enlightened gunnery doctrines of the period, and is dated 5th August, 1914. An historic document and truly a "convincing representation of the state of the field army artillery at this supreme moment."

With the completion of the forthcoming volume, "Campaigns, 1860-1914," the history of the Royal Artillery during the first two centuries of its existence will

be complete in eight volumes. It is interesting to conjecture how the immensity of the Great War will be brought into the picture. Of the volumes so far published, the present stands pre-eminent for its readability and interest.

History of the Great War. Order of Battle of Divisions. Part 2, B: The 2nd Line Territorial Force Divisions (57th-69th) with The Home Service Divisions (71st-73rd) and 74th and 75th Divisions. (H.M. Stationery Office). 10s.

This is the second volume devoted to the Territorial Army, the first, containing the records of twenty Territorial Force Divisions, having been published last year. All the eighteen divisions recorded in the new volume were war-time formations, not a single one was in existence before the War. London bore its full share of raising the Territorial Army, for over 450,000 men, one-seventh of the whole Territorial Force of England and Wales, passed through the ranks of the London Units. They saw service on the Western Front (in France and Belgium), in Egypt, in Gallipoli, in Macedonia, in Palestine, and in North Russia, as well as in Turkey (1919-22). The task of compiling this record has been arduous, but the author, Major A. F. Becke, R.F.A. (Retired), Hon. M.A. (Oxon.), records with gratitude the help he has received from divisional commanders, other officers and from Territorial Army Associations. The volume now completed, together with that published a year ago, will form an enduring record of war-time achievement of which the Territorial Army has every reason to be proud.

Cavalry Combat. (Published by the Cavalry School, United States Army). \$2.50.

In the Foreword, Major-General L. B. Kromer, Chief of Cavalry, states that, since the World War, there has been a definite need by officers of all branches for a compilation of historical examples, depicting the various types of cavalry combat. This volume, which was arranged by Major F. S. Jacobs, U.S. Cavalry, goes a long way to fulfil this need. The work—with the exception of a few pages devoted to a general discussion on mechanization—is related chiefly to the manifold activities of horsed cavalry during the Great War. Examples are culled from many theatres: France, Poland, Galicia, Palestine, Mesopotamia, etc., and in some cases the actions are described first from one side and then from the other. The result is a straightforward and objective narrative.

For British readers there can be no doubt about the value of such a study. Following the decision to mechanize the bulk of our Cavalry, the most weighty service that our senior mounted officers can render to the Army is to pass on their unique experience of the practical application of the principles of cavalry combat to their juniors who are growing up in the newly formed light tank regiments. These principles, modified to meet the changing conditions, will form a basis for the operations of the mechanized cavalry arm.

REGIMENTAL HISTORIES

The History of the 3rd (Prince of Wales's) Dragoon Guards, 1914-1918. (Printed privately).¹ 7s. post free.

This book depicts, in simple language, the story of the Regiment throughout the Great War. When the 3rd Dragoon Guards sailed in September, 1914, from

¹ Copies of this book are obtainable from M. D. Kerr, D.C.M., "St. Egwins," Shakespeare Road, Mill Hill, London, N.W.7.

Alexandria, in the s.s. "Corsican," nobody had any conception of the work that awaited them on the Western Front. By training and tradition, all ranks expected to be used as mounted troops, but during four years of war they rarely had a chance to act on horseback.

Always eager to undertake any task, however strange, the Regiment fought as infantry, as machine gunners, as bombers and snipers; or turned their hands to making roads or building railways, burying the dead and clearing the battle-fields. As an illustration of the spirit of the Regiment, a paragraph taken from a letter written by General Allenby to General Byng, may be quoted. "Especially are our thanks due to the 3rd Dragoon Guards, who held the Hooze area right manfully through a long and strenuous period. Their losses were great, but they never wavered." The British Army holds to no higher tradition.

The South Wales Borderers (24th Foot), 1689-1937. By C. T. Atkinson. (Cambridge University Press).

To a historically-minded individual the chronicle of the 24th Foot is sheer delight. The Regiment was raised in 1689 by Sir Edward Dering, third Baronet of Surrenden, nicknamed "The Black Devil of Kent." His portrait, depicting "his haughty and disdainful air, with a determined look and a hard mouth," stamps him as a fit and proper person to be the first leader of a regiment destined to become famous for hard fighting the world over.

To the general public the part played by the Regiment in the action of Isandhlwana Hill, a hundred and ninety years after its creation, where it was destroyed—only three men surviving—by overwhelming hordes of Zulus, after a deathless stand, is possibly the best known episode in its history.

The Queen's Colour was saved by Lieutenants Melvill and Coghill, who were themselves killed at the Buffalo River, some four miles from the field. In commemoration of their deaths, Queen Victoria herself placed a wreath of *immortelles* on this Colour and directed that a silver wreath should ever be borne round the Queen's Colour of both battalions of the Regiment.

After the victorious campaign of 1918, the 1st Battalion had the honour of escorting the Isandhlwana Colours with the Army of Occupation across the frontier into Germany.

The text is clarified by numerous illustrations and plates and is supported by a detailed index.

The 14th King George's Own Sikhs, 1846-1933. By Colonel F. E. G. Talbot. (Royal United Service Institution).

The 14th Sikhs gained their first battle honour for "Lucknow, Defence and Capture," and played a leading part in the first relief of that city under General Havelock. On 25th September, 1857, at sunset, the British forces were checked in the narrow lanes within some 500 yards of the beleaguered Residency; the moment was critical and Havelock decided to break through at all costs. Placing himself at the head of the 78th Highlanders and the 14th Sikhs, and accompanied by General Outram, he led the assault in person. Nothing could withstand the combined charge of the Scots and Sikhs, and the Residency was gained. During

the Mutiny period the Sikhs owed much to the remarkable character and personality of their commander, Mr. J. Brasyer, who enlisted in the East India Company's service as a private and rose to be Lieutenant-Colonel with a C.B.

At Gallipoli the Regiment raised its reputation to the highest pinnacle. After the Third Battle of Krithia, 4th June, 1915, General Sir Ian Hamilton, Commander-in-Chief, wrote of them: "In the highest sense of the word, extreme gallantry has been shown by this fine battalion. . . . The history of the Sikhs affords many instances of their value as soldiers, but it may be safely asserted that nothing finer than the grim valour and steady discipline displayed by them on 4th June has ever been done by soldiers of the *Khalsa*."

Nor was this praise won lightly. Out of 28 British and Indian officers and 450 Indian other ranks, who went into action on that day, all—save 5 officers and 79 other ranks—were killed or wounded. But not an inch of ground gained was given up and not a straggler came back.

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